

NOVEMBER, 1959

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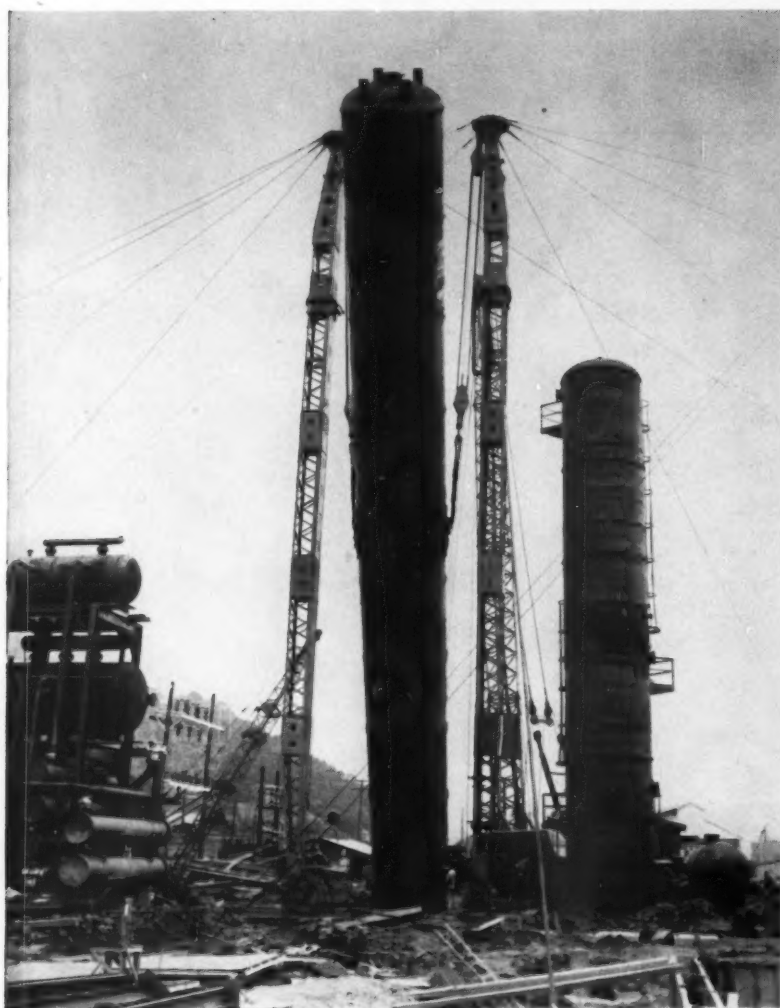
# ***Construction Methods*** AND EQUIPMENT

A M c G R A W - H I L L P U B L I C A T I O N

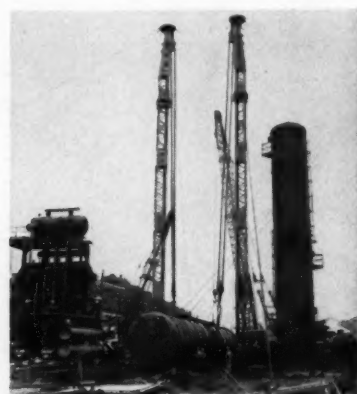


A 40-ton truck crane works its way across the lonesome and hilly terrain of Southern California to help double-barrel the 100-mi San Diego Aqueduct. Here it handles a 22½-ton pipe section.

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**UP...ALL  
IN ONE  
PIECE!**



**Here's how J. F. Pritchard & Company,  
Kansas City, Mo., erected this 340,000 lb.,  
102'-6" extractor in one piece**

The world's largest absorber will soon be in operation at the Hydro-carbon Extraction Facilities for United Fuel Gas Company of Charleston, West Va. Heart of the facility is the absorber vessel weighing 170 tons and measuring 102'-6" x 14' in diameter. To set this giant vessel upright, Pritchard used two 125-ton masts and Skagit hoists equipped with Yellow Strand Wire Rope. Pritchard selected two Yellow Strand Braided Safety Slings 49' long made of 8 parts of 1 1/8" wire rope to cradle the absorber as it was lifted and placed in position.

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***Yellow Strand***<sup>®</sup>



WIRE ROPE



SLINGS



CLIPS

**B.F. Goodrich**



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The new B.F. Goodrich Rock Service

tire has an enormous, double-chevron tread that defies rock cuts and bruises, grips the ground for full traction in forward or reverse. Under the tread is the B.F. Goodrich FLEX-RITE NYLON cord body that withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. This is why the FLEX-RITE NYLON body outwears even the extra-thick Rock Service tread, can be retreaded over and over.

See your B.F. Goodrich Smileage dealer today and find out how you can save on tires for all types of off-the-road jobs. He's listed under Tires in the Yellow Pages of your phone book. B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.

Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment

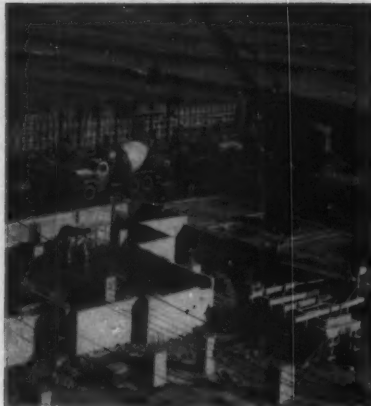


Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment

# B.F. Goodrich *truck tires*

© The B. F. Goodrich Company

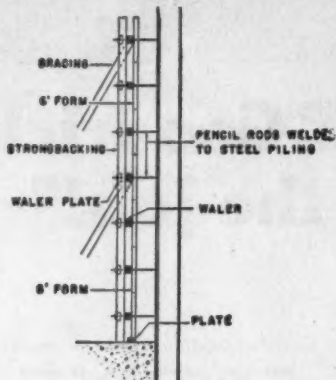
# 12¢ a Square Foot



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### Symons Forms, Sheet Piling and Pencil Rod Ties

How to pour a 750 foot lake retaining wall with thickness from 12 to 20 inches and 13 ft. high, faster and more economical. S. N. Nielsen Construction Company, Chicago, had that problem on a 600 unit apartment on Lake Michigan shoreline. Since a fixed core



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Was this method a success? After 250 feet of wall had been formed, poured and stripped, the forming costs were computed at 12 cents a square foot.

Contractors are finding almost as many uses for Symons Forms as there are jobs to bid on. It will pay you to send for our FREE form literature. And Symons Forms can be rented with purchase option.



**SYMONS CLAMP & MFG. CO.**

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NOVEMBER, 1959

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a result, Whyte Strand rope stands up longer, reduces downtime, boosts work output—brings out the very best in your equipment!

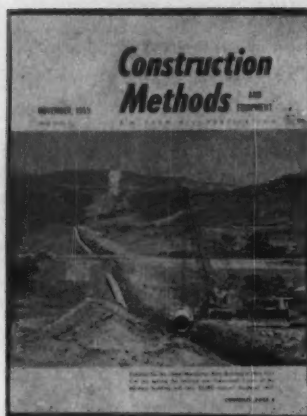
Here are special Whyte Strand ropes Macwhyte makes for you: shovel hoist rope, dragline, clamshell crane rope, boom hoist line, dozer rope, scraper rope, contractor's hoist and derrick rope, and winch line. Recommendations for all your equipment are shown in special brochure No. 5702, free for the asking.



# MACWHYTE Wire Rope

MACWHYTE WIRE ROPE COMPANY

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New Orleans, Ft. Worth, Portland, Seattle, San Francisco, Los Angeles



NOVEMBER, 1959

## Pay Dirt in This Issue

### ON THE COVER

To meet expanding needs, San Diego is paralleling with 72-in. pipe the 100-mi line that brings water to it from the Colorado River Aqueduct. To handle the heavy pipe on his 17-mi section of the job, Los Angeles Contractor E. A. Irish uses a 599-T American truck crane with hydraulic outriggers. And to level the rig on slopes, which run up to 60 deg, it is run up on a steel-frame wedge. A Caterpillar D8 dozer stands by to help move the apparatus up the hill.

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### NEXT MONTH

An unusual combination of machines makes up the paving train on a highway job in Ohio. A hopper type spreader places the concrete, and a new finisher-float combination gives it a smooth finish in a single pass. The concrete mixing plant feeds a fleet of Dumperetes that keep the paving train on the go.

### PHOTO CREDITS

p 62 (bottom) Harold Laney  
p 112, 113, 114, 117, Gosta Nordin, Stockholm  
p 131, 132, Dick Snyder Studios  
p 161 (center) Lens Art Photo

### New Equipment Boosts

#### Paving Efficiency .....76

Highlights of a transit-mix paving operation in Wisconsin are a batch plant with no overhead bins and a unique conveyor-belt spreader that the contractor built himself.



### Train of Jumbos

#### Carries Conduit Forms...80

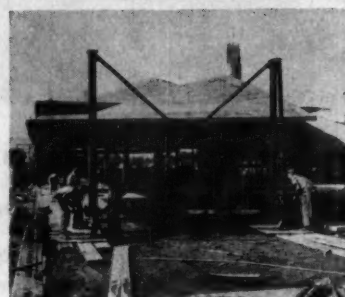
Concreting the walls and arched roof of the twin 44x69-ft conduits for the Niagara Generating Plant requires a train of specialized forms riding on traveling jumbos.



### Travelers Raise Forms,

#### Lower Cost of Roof....104

To build 44 hyperbolic paraboloid roof shells, the contractor devised a unique forming system that permits an unusually tight work schedule, greatly reduces forming costs.



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# "GORMAN-RUPP TRASH PUMPS HAVE TO BE GOOD, FOR THIS JOB...AND THEY ARE"

Michael T. "Mike" Broderick, V. P., Fago Bros. Construction Co.



"We have stretches of 16 hours a day when our Gorman-Rupp pumps must work satisfactorily to keep water and sewage away from the ditching and concrete pipe installation on this 96" storm-and-sanitary sewer we're installing. We like the performance of the pumps . . . self priming is a big feature and a time saver, and the pumps are easy to get at for routine maintenance. *Gorman-Rupp trash pumps have to be good for this job, and they are.* We've been using them for years."

This is a quotation by Mr. Broderick in connection with his firm's work on the 2.8 million dollar Kensington Expressway, in New York.

Add to Mr. Broderick's remarks, the fact that Gorman-Rupp non-clogging impellers will pass spherical solids up to 1½" in a 2" pump; 1½" in a 3" pump; 2" solids in a 4" pump and up to 2½" solids in a 6" pump. And just a turn of the wrist removes the patented end plate for quick access to impeller and wear plate. Write today for complete information.

**THE GORMAN-RUPP COMPANY**  
305 BOWMAN STREET                      MANSFIELD, OHIO



The section of  
the Daniel Boone Expressway  
shown above was built  
by Millstone Construction, Inc.,  
St. Louis.

## OLD DAN'L NEVER KNEW...

This newly completed concrete highway bearing the name of Daniel Boone speeds traffic through the very countryside old Dan'l once traveled and knew only as a tangled wilderness.

Modern construction genius employing Laclede's complete designed reinforcement service is helping create a multi-million dollar national system of expressways, of which the Daniel Boone is a part. To withstand the constant pounding of cars to and from ever-expanding suburbs, these new freeways must be built strong.

Much of the needed strength comes from Laclede designed reinforcing steels—multi-rib reinforcing bars, welded wire fabric, welded dowel spacers, center and recess joints, tie bars and accessories.



**LACLEDE STEEL COMPANY**

SAINT LOUIS, MISSOURI

Producers of Steel for Industry and Construction

# HERE'S A REALLY TOUGH JOB!

You're looking down one of the really tough jobs now under way. The job is the "Second Barrel" of the water line for San Diego, Calif. The ditch is 26 ft. deep at this point. In places it ran to 34 ft. The material is tough conglomerate—in some spots so hard that teeth were ground away in two hours.

Two Northwest Model 80-Ds are handling the tough assignment. There were miles of blue granite which had to be blasted, and because of the rugged terrain the machines often had to work on heavy grades.

The contractor is Lee H. Woods & Sons. Mr. Woods is a contractor and operator of long experience.

What he says is borne out by the performance of the Northwests on his job and the many other rock jobs that Northwests have handled. Mr. Woods says, "I have sat in the seat of shovels for 28 years before going into the contracting business myself, and my many years of experience have convinced me that, when it comes to rock, Northwests are the best of all. That's why in one of the toughest jobs ever attempted in the West, I bought two 80-Ds."

— And, remember that a *real* Rock Shovel makes the going easier and the output greater in ANY DIGGING.

## NORTHWEST ENGINEERING COMPANY

1503 Field Building • 135 South LaSalle Street • Chicago 3, Illinois



P-80-13-LC



Western moved and replaced over 4 million yards of earth in building special \$13,000,000 Jet runways for S.A.C. at Wright-

Patterson A.F.B. Western is pushing for November 1959 completion of runway, ramp and taxi areas. They're using Texaco 100%.

## Western uses Texaco Lube Plan

**Problem:** build a runway two miles long, two feet thick, and tough enough to take the landing shock of planes as heavy as a locomotive—a priority project that must be finished early in 1960. Western Contracting Corporation, Sioux City, Iowa, is moving ahead on this one right now, at the new \$22-million Strategic Air Command Wright-Patterson Air Force Base near Dayton, Ohio. And to help make sure they finish

on schedule, Western relies on a Texaco Simplified Lubrication Plan.

Here's how it works. The Texaco Plan cuts total lube inventory down to six products. That way, each of Western's lube rigs is a complete service station on wheels, able to lubricate every piece of equipment, wherever it is.

The low inventory Texaco Plan cuts chances for misapplication, too. It saves



Western's Texaco Plan enables mobile rig to handle all major lubrication in the field — eliminates wasteful deadheading.

## to pave the way for S.A.C.

manhours in storage and handling. It cuts paper work in ordering. And every lubricant in Western's Texaco Plan was chosen to meet the specific requirements of the job.

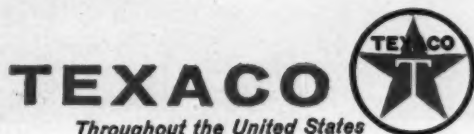
Cut costs on *your* next job. Get all the facts on the Texaco Simplified Lubrication Plan from your Texaco Lubrication Engineer, or write:

☆ ☆ ☆

Texaco Inc., 135 East 42nd Street, New York 17, New York.

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Throughout the United States

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**LUBRICATION IS A MAJOR FACTOR IN COST CONTROL**

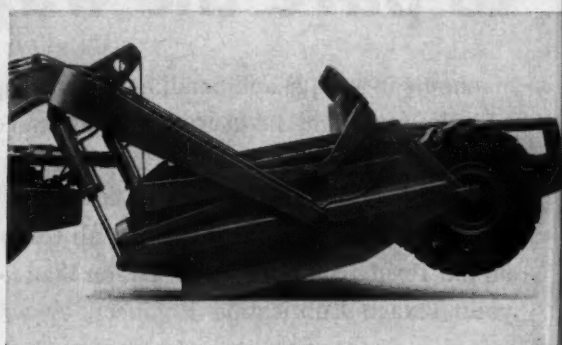
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



***The TS-260 has powered its way into leadership..***



The TS-260's 230 horsepower provides more than 18 horsepower per struck yard ... 30,000 pounds of rimpull at 1.9 mph.



The TS-260 is the only scraper in its class to offer positive down pressure on the cutting edge for fast, easy penetration into hard-packed materials.

**...move ahead with**

## THE ALLIS-CHALMERS TS-260

# Eats Up Big Yardage Faster than Anything in its Class

All over America, the 17-cu-yd TS-260 in action is convincing construction men that here's the top dirt hog in the medium-sized motor scraper field. It'll convince you, too—with its profit edge in horsepower, rimpull and exclusive positive penetration at the cutting edge.

One of the most commanding features of the TS-260 is its new Allis-Chalmers 16000 engine. This big, new power package delivers 230 horsepower at 2,000 rpm . . . more than 18 horsepower per struck yard of capacity . . . up to 12 percent more than most other units of comparable size. The 16000 engine also offers unmatched efficiency and fuel economy—result of controlled turbulence produced by a combustion system unique in the construction machinery field. There's over 30,000 pounds of rimpull in low gear . . . up to 25 percent more pull than others in

the 15-yard class at normal loading speeds.

Only Allis-Chalmers offers positive hydraulic down pressure on the cutting edge. In the loading cycle, this means fast, easy penetration even into hard-packed material for big 17-cu-yd loads. Double-acting scraper jacks also provide full power for rapid lifting of loaded scraper bowl. Result—faster getaways for loaded scrapers, faster work cycles.

When the ground gets soft or muddy, KON-TORK differential automatically goes to work *shifting power from the wheel that slips to the wheel*

*that grips* . . . enables the TS-260 to walk right through axle-deep mud if it has to. KON-TORK differential also permits normal steering and complete control of the unit when varying torque is being delivered to drive wheels.

The TS-260 is loaded with other important performance and production advantages, too. Original, low, wide bowl with curved bottom reduces loading resistance . . . speeds loading cycles. Smooth 90-degree turning ability permits 180-degree turns in less than 31 ft . . . an air-actuated transmission brake lets operators upshift swiftly and surely without double clutching.

Your Allis-Chalmers dealer will be glad to show you all of the high-performance features on the TS-260 . . . and to prove their worth in an actual demonstration on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

**in performance, dependability, profit for its owners**



When the going gets tough, KON-TORK differential automatically shifts power from the wheel that slips to the wheel that grips . . . keeps the TS-260 moving through the mud-diast going.



TS-260

17-cu-yd heaped  
230 horsepower  
44,800 lb

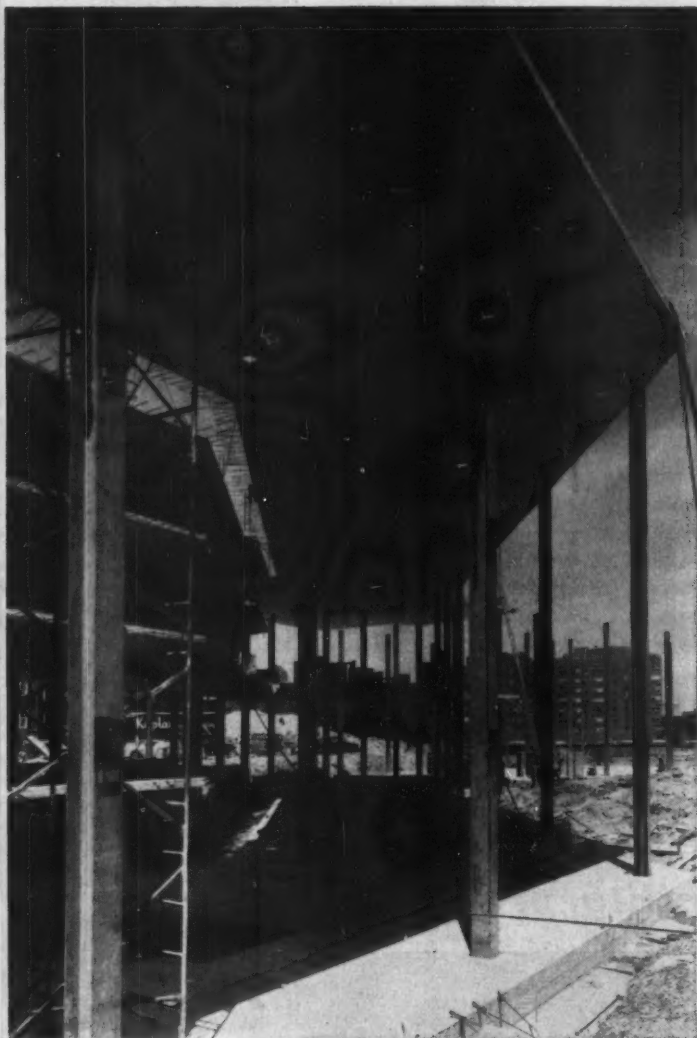
KON-TORK is an Allis-Chalmers trademark.

## ALLIS-CHALMERS... power for a growing world



## "We raised the roof in Chicago . . . with lift-slabs of POZZOLITH concrete"

**HAROLD KAPLAN**, President  
Kaplan Contractors, Inc. of Chicago



**FIRST MULTI-STORY LIFT-SLAB PROJECT** in Chicago—The "Holiday Lodge" motel—required 16 concrete slab sections, each 8" thick. A total of 80,000 sq. ft. of slab was lifted in only 2½ weeks. Concrete strength tests—made by H. H. Holmes Testing Laboratories—consistently ran from 3500 to 4000 psi at 7 days.

**LIFT-SLAB CONSTRUCTION** . . . all roof and floor slabs are placed and cured individually at ground level—in a "stack". Individual slabs are then raised to desired height by hydraulic jacks.

"Our organization is built on *creative contracting* . . . some call it the 'Kaplan Method'. It's a combination of know-how and know-why that helps us build better for less. On the 'Holiday Lodge' project we determined that the concrete lift-slab method of construction would provide significant structural and economic advantages.

"Concrete of uniform high flexural strength is essential to allow early lifting of the slabs without cracking. Early lifting provides significant savings in construction costs.

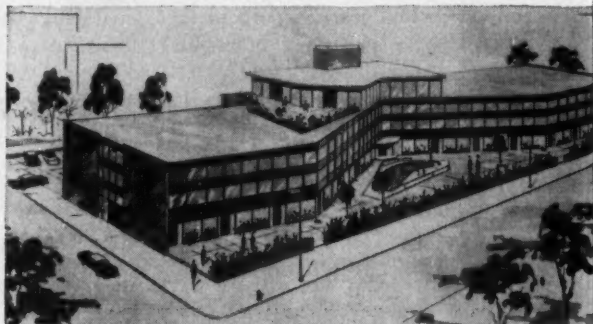
"The specifications called for concrete of 3000 psi at 28 days. Our past experience with POZZOLITH, confirmed by our ready-mix supplier — Material Service Corporation—indicated their POZZOLITH concrete would easily meet the specifications and would also provide the high flexural strength needed for early handling.

"We raised the roof one week ahead of schedule . . . and in 80,000 square feet of lift slabs there was not one crack.

"We're very pleased with the economies and excellent results—and we know that POZZOLITH helped us do a better job . . . faster, for less . . . at 'Holiday Lodge'."

**For lowest cost-in-place . . . superior quality concrete—there's no equal to POZZOLITH. Call in the local Master Builders man to demonstrate how POZZOLITH can help put you ahead on your current job.**

*The Master Builders Company, Cleveland 3, Ohio  
Division of American-Marietta Company  
The Master Builders Co., Ltd., Toronto 15, Ontario  
International Department, New York 17, New York  
Branch Offices in all principal cities.*



**"HOLIDAY LODGE"** . . . architect's sketch of new \$1.5 million, 100-unit Chicago motel. Architect: Louis I. Simon • Consulting Engineer: Paul Rogers & Associates • Lift-Slab Contractor: Great Lakes Lift Co. • General Contractor: Kaplan Contractors, Inc.—all of Chicago.

POZZOLITH Ready-Mixed Concrete was supplied by Material Service Corporation, Chicago.

# MASTER BUILDERS POZZOLITH®

\*POZZOLITH is a registered trademark of The Master Builders Co. for its concrete admixture to reduce water and control entrainment of air and rate of hardening.

# Construction News From Washington

Washington, D.C.  
November, 1959

## Ceilings on Highway Funds

The spending lid has been slapped on the big multi-billion dollar highway program. About \$2.7 billion will still come from the federal coffers for roadbuilding during this fiscal year, but there are new ground rules on when the money can be spent. Overall, it means a cut of over \$400 million from previously estimated federal highway expenditures for the year ending June 30.

The federal government told the states that they will be allowed a total—for all states—of \$600 million in the period from July 1 through October 31, 1959. Because the controls over highway expenditures were based on an October 1 starting time, the bulk of this quota has already been spent or obligated by the states.

Between November 1 and January 1, total federal expenditures will amount to only \$300 million. From the first of the year to March 31 they will amount to \$900 million. From April 1 through June 30, 1960, another \$900 million in federal money will be available.

States get their slices of the total federal money available on the same basis as they now receive their annual apportionments—based on each state's percentage of unbuilt roads to the nationwide total. Money due a state during any quarter that is not spent can be carried over into another period.

## White House in Charge

The decision by the federal government to tighten controls over highway spending came directly from the White House. It stems from the shortage of funds in the Highway Trust Fund to pay for the new roads and the President's firm decision not to let the program go to deficit spending.

The action means that states will have to impose restrictions on their highway construction. The Bureau of Public Roads has ordered its field offices to keep a close tally on states to make sure they don't go over the set quotas.

If a state wants to build at a faster pace than the new federal limits allow, it can do so with permission from BPR. The state, however, may have to wait until around 1963 before the federal government can reimburse it for such expenditures.

Right now, federal aid for highway construction is expected to stay around \$2.7 billion a year for at least the next two fiscal years. Then, depending upon tax receipts from gasoline, tires, tubes, etc. earmarked to pay for the roads, adjustments may be made upward.

This is the present thinking by the Administration. Congress, however, is sure to raise a fuss when it returns next January. Then, the matter seems sure to be re-opened.

*continued on next page*

## **Prospects for Water Projects**

The Bureau of Reclamation's construction budget for fiscal year 1961 (starting July 1, 1960) probably will run about \$300 million, almost \$25 million higher than its present budget. Interior Secretary Fred Seaton had predicted the 1961 budget might run about \$267 million, if no new starts had been voted this year by Congress. But he added that the 1961 budget could run as high as \$310 million if construction contracts on all eight new reclamation starts—voted by Congress—were awarded during the present fiscal year. The Bureau has announced that it plans to call for bids and award contracts on the new starts as soon as possible, and in most cases, before the end of the year.

Army Engineers expect their construction budget for fiscal 1961 to run about \$1 billion (including appropriations and carryover funds), considerably higher than the present budget because of high second-year costs involved in constructing 59 new starts voted by Congress over President Eisenhower's veto.

## **Snake River High Dam**

Hearings on Pacific Northwest Power Company's proposed \$178 million Mountain Sheep Dam probably will be scheduled for early 1960 by the Federal Power Commission. The controversial project—to impound 3,500,000 acre-feet of water and generate 2,000,000 kilowatts of power—is certain to be attacked by public power groups. The Interior Department also has criticized construction of the high (690 ft) dam on the Snake River between Oregon and Idaho until adequate migratory fish facilities have been developed. The Army Engineers, however, have recommended construction of such a dam.

## **GOP Policy on Public Works**

Republican leaders are trying to outline a party policy on public works in advance of the 1960 Presidential election.

A committee headed by businessman Charles Percy estimated requirements in 1976 but came up with no radical proposals. Fundamentally, the committee's report is close to the Eisenhower Administration's policies. It emphasizes private and local initiative.

Here's what the Percy Report recommends:

**Housing:** Millions of new units must be built, and the government must assure prompt availability of funds.

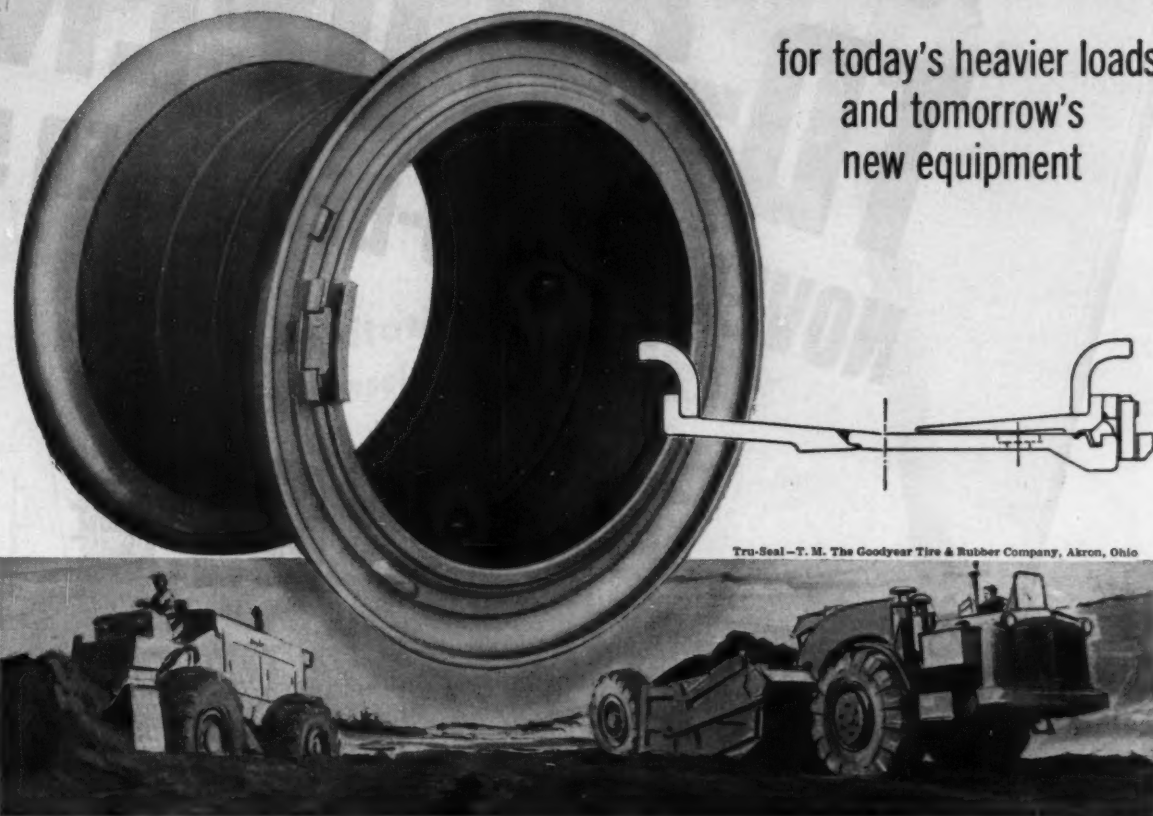
**Health:** Federal aid is needed for medical schools and mortgage guarantees for nursing homes; the present law on hospital construction must provide better aid for hospital modernization and repair.

**Education:** The Eisenhower program of matching federal grants for schoolrooms is endorsed. But there may be efforts to push the White House toward a more generous program.

**Water Resources:** The Percy Report backs a vigorous federal effort, but recommends a revival of Pres. Eisenhower's "partnership" program for hydroelectric projects.

# Introducing The New Earth-Mover Rim

for today's heavier loads  
and tomorrow's  
new equipment



Tru-Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

To meet the increased tonnages and the higher speeds of today's and tomorrow's earth-moving equipment, Goodyear presents a whole new line of heavier, stronger rims.

The new Earth-Mover Rim offers these standout advantages in every size from the smallest to the largest:

Extra thickness and weight to withstand greater horsepower, greater tire pressure and heavier loads. Down time reduced to a minimum.

Heavy-duty bead seat band driver—to prevent slipping.

Sealing ring—Goodyear's famous Tru-Seal principle provides positive air seal.

The Goodyear Earth-Mover Rim is now available in 29-inch and 33-inch diameters. These fine job-fitted rims are your best insurance against premature tire and rim failure.

Next time you need rims, why not benefit by Goodyear's incomparable experience in building rims of every kind and size for all types of vehicles. See your local distributor, or write:

Goodyear, Metal Products Division, Akron 16, Ohio.

Your tires go farther on RIMS by

# GOODYEAR

MORE TONS ARE CARRIED ON GOODYEAR RIMS THAN ON ANY OTHER KIND

**YOU ARE INVITED TO**  
**TD-25 OPEN**  
**NOVEMBER 30-DECEMBER 5**



# HOUSE, U.S.A.

INTERNATIONAL HARVESTER COMPANY  
180 NORTH MICHIGAN AVENUE • CHICAGO 1, ILLINOIS

## An open invitation to profit-conscious contractors

At Open House, U.S.A., you won't be viewing "just another big tractor." Not on your life!

This is the big, new International TD-25's "coming out party." And the "25" is coming out "loaded for bear!"

At Open House, U.S.A., you'll preview a king-sized crawler that has more proven, high-output exclusive features than anything else on tracks... The new TD-25 is:

—the only king-sized crawler powered by the new 230-hp, 6-cylinder, direct-start DT-817 diesel—loaded with capacity-adding, life-prolonging features no other engine has!

—the only king-sized crawler with world-proved Planet Power steering, that gives you fingertip power-steering and Hi-Lo, on-the-go power-shifting. Full-time "live" power on both tracks adds payload capacity as no other crawler can!

—the only king-sized crawler with International-developed double-box-beam track frames, the industry's strongest; the only one carried on Dura Rollers—the rollers you can power-lubricate without affecting seal life or efficiency

—the ones that make 1,000-hr lube checks practical!

—the only king-sized crawler with so many far-ahead features it can outearn competitive rigs up to 50%, on an amazing variety of tough jobs!

Watch for the word on when and where your Distributor will hold TD-25 Open House, U.S.A. And be there, for sure. Be one of the first to size up the profit-making advantages of the big, new International TD-25.

More productive power to you!  
International Harvester Company



**International<sup>®</sup>  
Construction  
Equipment**

International Harvester Co., 180 North Michigan Ave., Chicago 1, Illinois  
**A COMPLETE POWER PACKAGE:** Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Walker Cut Stone Co., Milford, Kansas, replaced six smaller overworked gasoline haulers with only two 19-ton Model 65 Payhauler trucks! Their "65's" deliver 150 tons of limestone per hour, from quarry to crusher.

## How new rock-ribbed 65 Payhauler® pair



## speeds "write-off," replacing six smaller rigs!

—for Walker Cut Stone Co., Milford, Kansas

**Two new International 19-ton 65 Payhauler trucks**—with the new weight-saving corrugated bodies, and the new 250-hp D-817 diesel engine—have replaced six smaller gasoline trucks for Walker Cut Stone Co., Milford, Kansas.

Results are amazing! Only two operators instead of six to pay! Only 40 gallons of low-cost diesel fuel used daily (total) by the two Payhauler rigs—against several times 40 gallons of high-priced gasoline formerly swilled by the carbureted outfits! And only two machines to maintain, instead of six! "Write-off" of the Payhauler investment speeds in "high gear!"

### **Payhauler features increase capacity!**

Even against competitive haulers of similar rated

capacity, the new 65 Payhauler gives you overwhelming advantages!

Of all off-road haulers in its size class, only the 65 Payhauler has the International-developed rock-ribbed corrugated body! This strength-multiplying principle lets the "65" shed 5,000 lbs. of power-wasting weight, and gain a full ton of payload capacity.

**Prove the power-to-payload advantages** the new rock-ribbed 65 Payhauler delivers! Compare the "65's" cycle-speeding combination of air-assist shifting; 11-second dumping, fast reversing; super-power braking; bonus-leverage, vibration-free power steering! And for 27-ton capacity, note how the 375-hp "95" leads the field. See your International Construction Equipment Distributor for a demonstration!



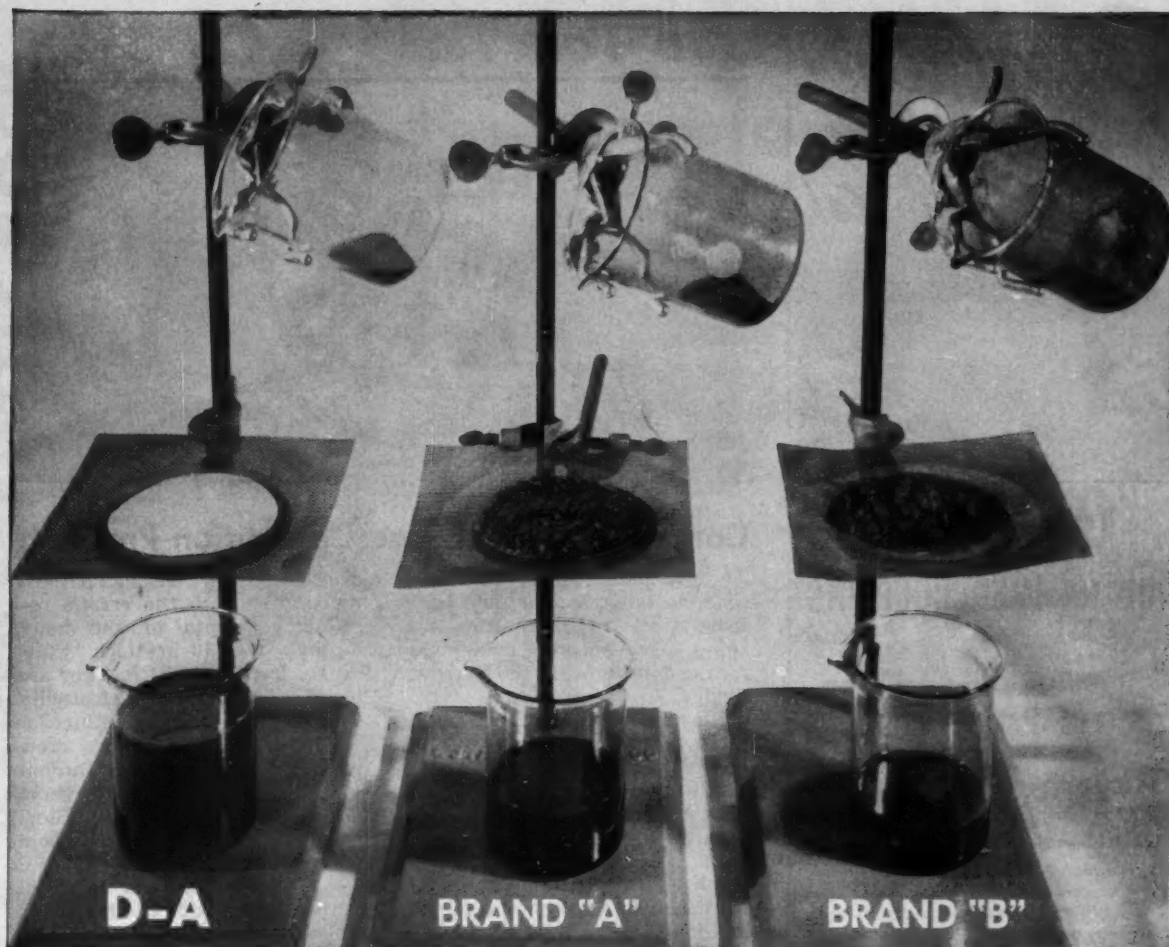
In only 11 seconds you dump the "65's" 19-ton load —with 3-stage, double-acting, constant-power hoist! Positive up-and-down snubbing guards against impact!



## **International Construction Equipment**

International Harvester Co., 180 North Michigan Avenue

**A COMPLETE POWER PACKAGE:** Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



## Stop sludge, stop corrosion with D-A UNIVERSAL GEAR LUBE

The unretouched photograph above shows the results of a 24-hour accelerated oxidation or sludge test. On the right, two leading brands of gear lube are badly oxidized following the test while, on the left, D-A Universal Gear Lube remains clear, stable and capable of extended use.

Here's what this means to your operation: film strength is the element of a gear oil which prevents wear. To obtain high film strength, extreme pressure additives are placed in the lubricant. At a temperature of about 250° — often encountered in heavy-duty equipment operation — these additives can oxidize, as they

have in the competitive oils seen above. When this oxidation occurs, the oils become extremely corrosive and rapid wear results. Tests prove that D-A Universal Gear Lube does not corrode, even at temperatures as high as 300° F.

D-A Universal Gear Lube does not sludge or oxidize under high operating temperatures because D-A research has established successful means of retaining the stability of D-A's high-quality base oil while maintaining the high film strength necessary for extra-heavy-duty equipment operation. For greater protection of *your* equipment under heavy

load and high temperature conditions, specify D-A UNIVERSAL GEAR LUBE.



*Lubricating heavy-duty equipment across the nation since 1919.*

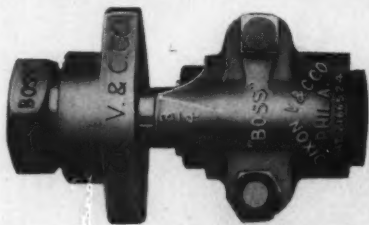
**D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.**

# Reliability THAT ASSURES Lower Drilling Costs!



## "GJ-BOSS"

### AIR HAMMER COUPLING



The washerless coupling for all heavy-duty air hose connections to hand drills, wagon drills, drifters, jumbos. Famous for strength, durability and efficiency. Quickly connected and disconnected, with no lost or worn-out washers to replace. Compact and Heavy Types.

"BOSS" Air Hammer Coupling—same as above except Washer Type.

For lighter services—"GJ-Dixon" and "Dixon" Air Hammer Couplings.

## "BOSS" Self-Honing AIR VALVES

Used for the efficient control of air on compressors, manifolds, headers, sump pumps, etc. Strong, durable, compact. Self-adjusting, quick-opening, full flow. Male or female I.P.T.



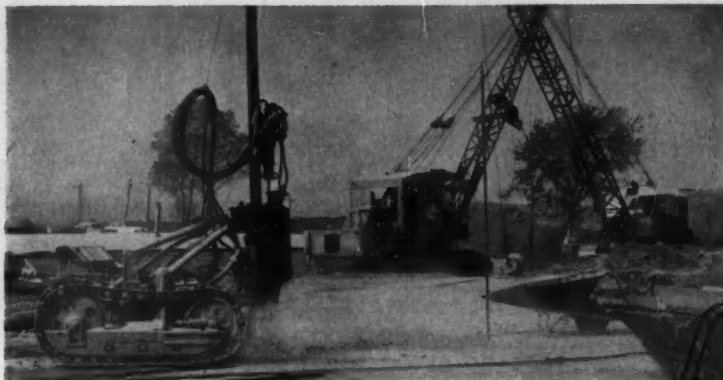
Bronze plug automatically hones to perfect seal against harder metal of valve body.

Stocked by Manufacturers and Distributors  
of Industrial Rubber Products

## DIXON Valve & Coupling Co.

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.  
BRANCHES—CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON  
DIXON VALVE & COUPLING CO. LTD., TORONTO, Associate Companies  
Bull Iron Company, Inc., Quakertown, Pa. • Precision Brass Steam Company, Camden, N.J.

## Job Talk...



### Concrete Bunkers Pose Demolition Problem

At Fort Hamilton, N. Y., heavy concrete bunkers that date back more than a half-century are being demolished to make way for the approaches of the Narrows Bridge.

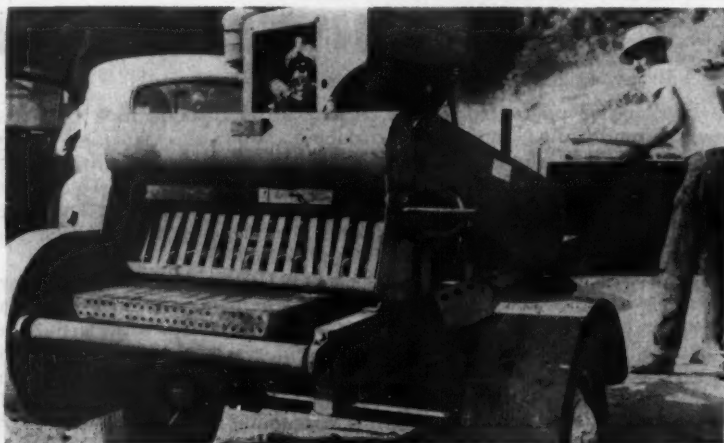
Blasting subcontractor George Cappy, of Corona, Long Island, finds drilling and shooting the massive gun emplacements that once protected New York Harbor a tough job. Heavy reinforcing—including some 12-in. steel I-beams—is buried haphazardly in the concrete; that complicates the drilling. And to prevent damage to nearby structures, they have to keep shots light.

Two Chicago Pneumatic Trac-

drills bore 3-in. holes in a pattern that varies with the erratic reinforcing. Depth of the holes through the 18-in.-thick walls ranges from 18 to 24 ft. They are using 1/4 in. round drill steel with Timken tungsten carbide bits.

For each shot, Cappy's crew loads about 18 holes with DuPont 40% Special Gelatin. They shoot about three times a day. Steel mats cover the blast area to hold down flying debris.

A Lima 604 crane equipped with a 10,000-lb headache ball is on hand to break up over-size fragments. The job involves demolition of about 68,000 yd of concrete altogether.

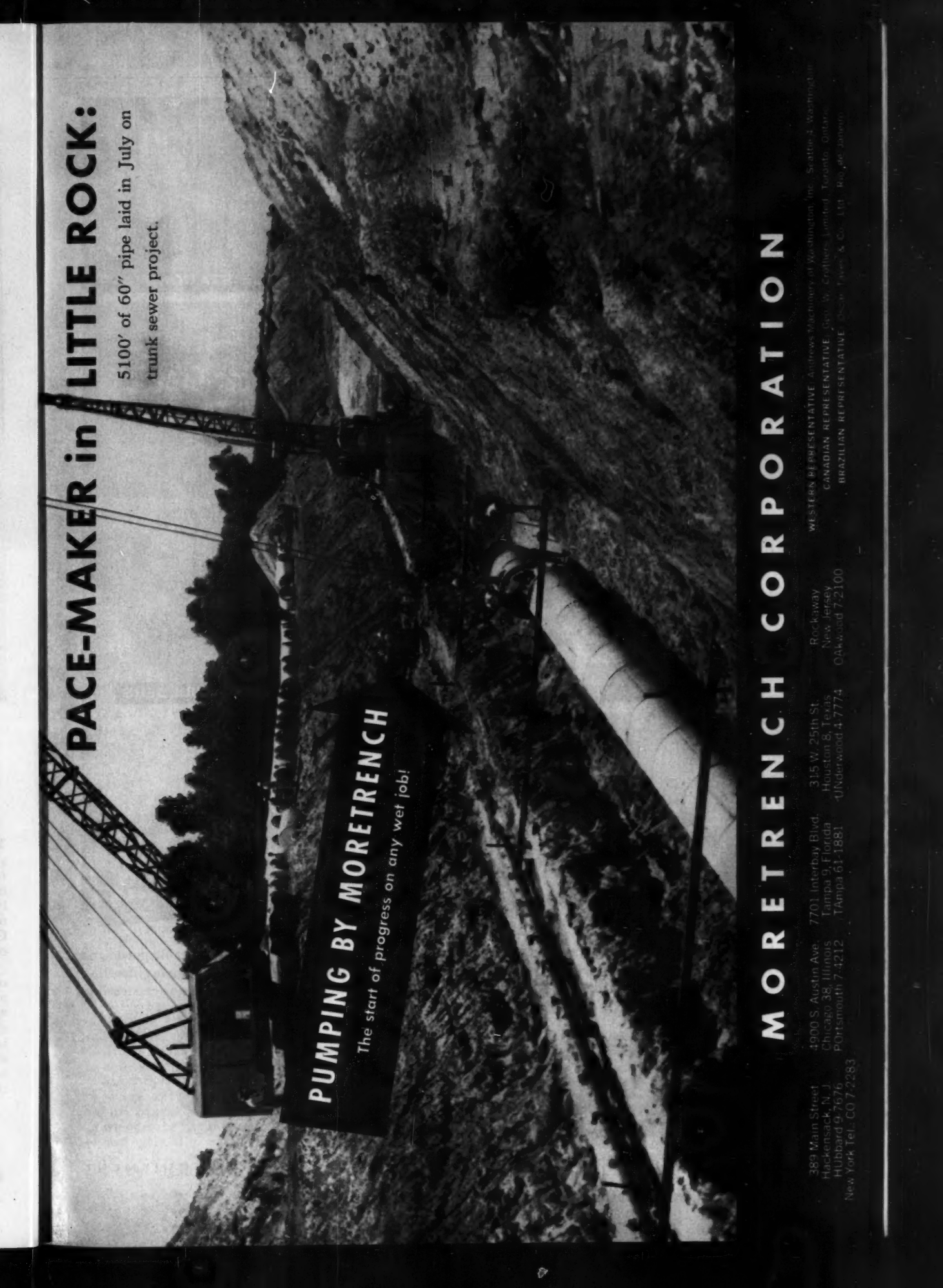


### New Way to Coat Steel Forms

Joint venture contractors Gordon H. Ball and Ball & Simpson Construction Co. are saving money with a new emulsion-type compound that coats steel form panels

for a retaining wall at Walnut Creek, Calif.

Applied by a coating machine as much as two weeks before forms are locked up for a pour,



**PACE-MAKER in**

**LITTLE ROCK:**

5100' of 60" pipe laid in July on  
trunk sewer project.

**PUMPING BY MORETRENCH**

*The start of progress on any wet job!*

## MORETRENCH CORPORATION

389 Main Street  
Hackensack, N. J.  
Hubbard 9-7676  
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CITY STREETS

proved on all  
types of jobs



SERVICE STATIONS



PARKING LOTS



PLAYGROUNDS

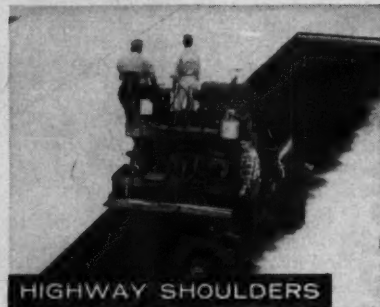
Barber-Greene  
873 Finisher



DRIVEWAYS



HIGHWAYS



HIGHWAY SHOULDERS



ALLEYS

paves on crawlers...  
travels on rubber



Here's the only asphalt finisher that paves on crawlers and travels on its own hydraulically retractable pneumatic tires. Write for new bulletin describing such exclusive Barber-Greene features as automatic tamping, leveling and thickness controls . . . new, hydraulically folding hopper . . . simplified controls with single-stick steering.

Representatives in Principal Cities of the World

**Barber-Greene**

Main Office and Plant AURORA, ILLINOIS, U. S. A.  
Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia



59-15-F

CONVEYORS...LOADERS...DITCHERS...ASPALT PAVING EQUIPMENT

## JOB TALK . . .

*continued*

the emulsion is a stable form lubricant that remains effective for a long time.

And it's economical. The contractors estimate that coating all the 2x4-ft panels used in forming the 18-ft-high, 180-ft-long retaining wall would ordinarily take about 40 gal of form oil. They needed only 25 gal of the new emulsion, recently developed by Shell Oil Co., to do the job. Cost of the solution, a mixture of one part form compound and 10 parts water, is about \$0.20 per gal.



### Rolling Work Platforms

Two subcontractors, Sobel and Krause and A. Munder & Son, joined forces to solve a problem they faced in their work on the Time-Life and Union Carbide Buildings in New York City.

They built rolling platforms made of Waco standard steel frames to hold workmen installing spandrel flashing above the window openings of the buildings. The 4-ft-wide platforms, enclosed by a guard railing, extend through the window openings and hold workmen within easy reach of their work.

After installing flashing at one window, they simply roll the rig to the next opening and set it up there in a few minutes. A steel tube, attached to the back of the frame and topped by an adjustable screw and flat plate head, fits snugly against the ceiling to secure the platform safely without benefit of bulky counterweights or time-consuming tie-downs. In all the two cooperating contractors are using 36 platforms on the buildings.

# ONLY RAMSET

## has the exclusive RED TIP fastener

WOOD TO CONCRETE



STEEL TO CONCRETE



WOOD TO STEEL



STEEL TO STEEL



INTO STEEL



INTO CONCRETE



Red Tip serves as guide in barrel of tool, and indicates proper penetration.



## with guaranteed performance

Red Tip fasteners—over 100 threaded studs, drive pins and eye pins—are made to do a *better* fastening job into concrete or steel. Produced from top-quality steel and austempered for extra strength, these fasteners are your best buy for efficient, trouble-free powder-actuated fastening.

Ramset Red Tip fasteners are guaranteed on every approved application! Under Ramset's unique "100-for-100" guarantee, you pay only for the number of fasteners called for on your plans. Insist on the Red Tip fastener . . . call your Ramset dealer today for details—he's listed under "Tools" in the Yellow Pages!

*In addition to powder-actuated fastening, the versatile Ramset System includes Shure-Seal hammer-in tools for light fastening, and Ringblaster® heavy-duty kiln gun.*

## Ramset® Fastening System



WINCHESTER-WESTERN DIV. • OLIN MATHIESON CHEMICAL CORPORATION  
201-K WINCHESTER AVENUE • NEW HAVEN 4, CONNECTICUT

CONTRACTORS SAVE MONEY  
BY STANDARDIZING ON THE

all purpose

(20 TO 1650 H.P. IN

53 "IN-LINE" AND "V"



71 "IN-LINE" AND "V"



THE GM DIESEL  
ALL-PURPOSE  
POWER LINE  
20 to 1650 H.P.

in only 3 cylinder sizes



NEW

"2-53"  
20 to 47 H.P.



NEW

"3-71"  
33 to 67 H.P.



NEW

"4-71"  
38 to 97 H.P.



NEW

"6-71"  
53 to 110 H.P.



NEW

"8-71"  
81 to 120 H.P.



NEW

"12-71"  
89 to 167 H.P.



NEW

"16-71"  
76 to 193 H.P.



NEW

"24-71"  
112 to 252 H.P.

# power line

ONLY 3 CYLINDER SIZES)



"Jimmy" Diesel parts...  
highest interchangeability  
...lowest cost

Looking to shave your costs and boost your profits? Then take a close look at the savings you'll make when you standardize on the GM Diesel All-Purpose Power Line—particularly when it comes to buying parts.

For instance, when you buy a cylinder kit assembly (rings, pistons, liner, piston pin) for a "Jimmy" you'll save \$40.97 over engine "A," \$26.84 over Diesel "B" and \$12.39 over engine "C."

And when you buy from your GM Diesel distributor you get parts of the highest quality with latest improvements designed and built to keep your "Jimmy" running right.

Or take parts stocks. A "Jimmy" fleet works with fewer spare parts than any other Diesel for one simple reason—highest parts interchangeability. In fact, three cylinder sizes cover the entire power range from 20 to 1650 H.P.—many parts for a 33 H.P. GM Diesel also fit a 1650 H.P. "Jimmy."

What's more, a "Jimmy" gives you a smaller, lighter Diesel with more guts and go than any other engine. Add up the score—power, price, parts, performance—and you get only one answer: *It pays to standardize on "Jimmy" Diesel power.* Why don't you?

**Only your GM Diesel Distributor  
has all the latest genuine "Jimmy" parts**



## GM DIESEL

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 26, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario  
Parts and Service Worldwide



NEW

"6V-71"  
112 to 222 H.P.



NEW

"8V-71"  
130 to 334 H.P.



"6-110"  
160 to 333 H.P.



NEW

"12V-71"  
224 to 504 H.P.



NEW

"16V-71"  
300 to 675 H.P.



NEW

"24V-71" (Twin 12)  
448 to 1008 H.P.



NEW

"32V-71" (Twin 16)  
600 to 1350 H.P.  
(Turbocharged—1650 H.P.)

# THE TUNNEL



Ralph E. Mills Company  
Frankfort, Kentucky



**Concrete Is Pumped Into Forms**  
around tunnel walls and ceiling.  
Linking the towns of Duty and  
Carbo, Virginia, the 8,240 foot  
tunnel required removal of  
170,000 cu. yds. of earth, used  
60,000 cu. yds. of concrete.

# AT

# SANDY RIDGE

**To build a railroad lifeline, they needed a petroleum lifeline, and they got it from Cities Service**

The time was 5:20 P.M.—the end of a warm May day.

Far below in the town of Duty, people headed quietly toward home and supper. But here on remote Sandy Ridge—here, high in the Alleghenies of Western Virginia, excitement reigned.

Suddenly, the mountain shook with a resounding explosion. 600 cubic yards of earth and rock came shattering to the ground. Phase One of the Tunnel at Sandy Ridge had ended.

A BORE 8,240 FEET LONG, a bore which required removal of 170,000 cubic yards of earth was complete. Phase Two, the pouring of 11,000 cubic yards of concrete flooring and the laying of track to link the towns of Duty and Carbo, could begin.

The Ralph E. Mills Company, contractor for the entire job, was plainly satisfied. For throughout the 13 months of Phase One, its men and equipment had worked without interruption in this inaccessible location where supply problems could have been acute—particularly petroleum.

But Mills had taken great pains beforehand to assure that there would be no supply problem. Combing the list of local fuel distributors, they had eventually settled upon J. F. Bolton, Cities Service distributor in St. Paul, Virginia.

"We couldn't have made a better choice," says a Mills official. "Bolton took that Cities Service truck over some of the toughest terrain we've ever seen a fuel distributor travel. Mud, snow, ice, jagged rocks—nothing could stop him. And always he'd arrive with a complete stock of all the Cities Service products we needed. Moreover, despite the rugged operating conditions of our equipment, we never had a lubrication failure using his Cities Service products."

If you have a tough job coming up—and if you're going to need this kind of service and product performance, be sure to contact your nearest Cities Service distributor and let him help you with your planning. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

## CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

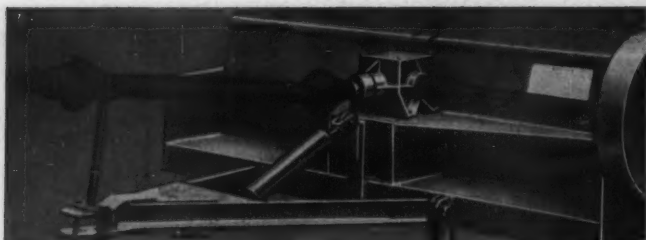


Grinding Up Side of Cliff was typical of obstacle course that Cities Service distributor J. F. Bolton had to run in order to supply the Ralph E. Mills Company. Neither mud, snow, nor ice could interrupt delivery.

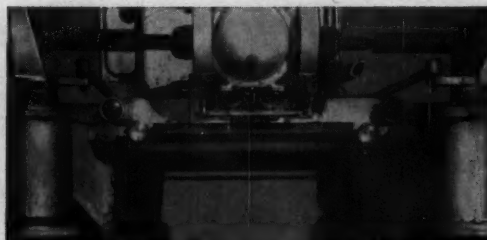
### CITIES SERVICE PRODUCTS USED

### REASON FOR USE

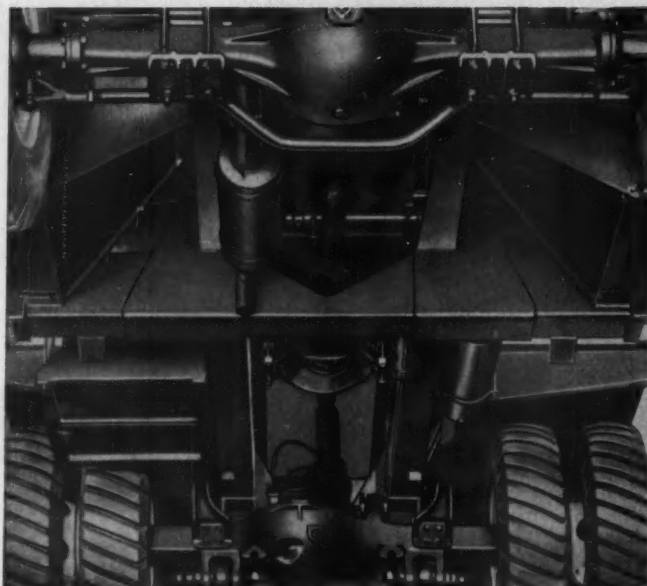
- |                                  |   |
|----------------------------------|---|
| C-300 Motor Oil .....            | A versatile "start-stop" motor oil for both diesel and gasoline engines. Outstanding protection against oxidation, corrosion, sludge, and varnish.  |
| Milemaster Gasolene .....        | An exceptionally high-powered regular gasoline with built-in protective features.   |
| Cities Service Diesel Fuel ..... | Clean-burning, economical.  |
| Trojan MP Gear Oil .....         | An excellent extreme pressure lubricant that gives maximum protection to gears.   |
| Trojan H-2 Grease .....          | A multi-purpose lubricant suitable for wheel bearings, chassis, and water pump. Gives outstanding protection against water and rust. Reduces inventory. A lesser amount is required for each lubricating job. |
| Sentry No. 1 .....               | A good general lubricant which Ralph E. Mills Company has found excellent for forms.  |
| Sentry No. 4 .....               | A superior engine and bearing oil which Mills found particularly suitable for its air compressors.  |



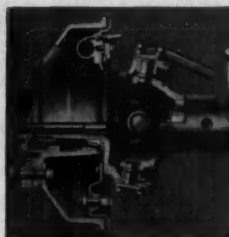
Shielded Farm Implement Drive, Tractor P.T.O. to Gear Box



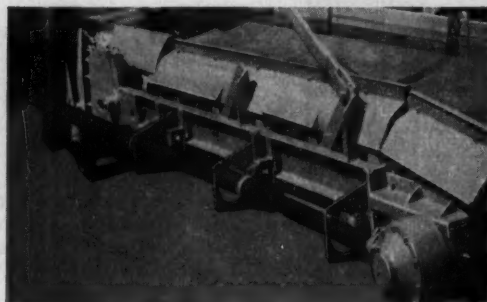
Differential to Drive Sprocket, Straddle Truck



Mobile Crane, All-Wheel Drive Propeller Shafts



Jointed Front-Driving Axle High Angle, Double Joints



Road Grader, Detachable Belt Conveyor Drive

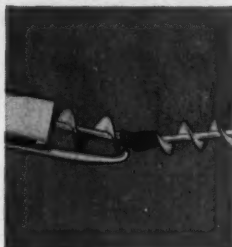
## POWER TRANSMISSION PROBLEMS SOLVED

### with Blood Brothers U-Joints

Rockwell-Standard engineers see—and help *solve*—a tremendous variety of problems involving a need for universal joints. Applications range from manual steering assemblies...to power take-off drives...to heavy duty propeller shafts.

To "get the power through," Blood Brothers Joints are built in the widest range of types and sizes. This range, plus application experience, can be valuable to you. Whether you want to "take power around corners"...or allow for possible minor misalignments—you can call on Rockwell-Standard engineers.

They'll cooperate to save your staff's time—on common or unusual power transmission problems.



Jointed Screw Conveyor



Tractor Steering Assembly



Transmission P.T.O. Drives Pump and Gear Box



**ROCKWELL-STANDARD CORPORATION**

**Blood Brothers Universal Joints**

ALLEGAN, MICHIGAN



For general  
information,  
request our  
Bulletin 557

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Want lowest cost per ton?

buy Cedarapids  
Built by  
IOWA

Cedarapids

Cedarapids

**How one contractor dismantled G60 Plant, moved 100 miles, set up and started producing in 3½ days!**

Schultz & Lindsay Construction Company, Fargo, North Dakota, have moved their Cedarapids G60 Batch-type plant 12 times in 3 years!

They can dismantle the plant and get it ready for transport in 12 hours. They can set up the mixing unit, drier, dust collector, cold-feed equipment, yard piping, steam generator and wiring in 3 days. Their record move required just 3½ days to tear down, transport 100 miles, set up, and start operating! They never have a crane on the job.

Such fast and frequent moves are made possible by Cedarapids portable design and the exclusive self-erecting mechanism, not only on Model G60 plants, but also on G50 and G40 Models.

### **100% Portable — Self-Erecting CEDARAPIDS BITUMINOUS MIXING PLANTS Reduce Profitless Between-Job Delays**

Count what these portability benefits of Cedarapids batch-type Model G plants mean to you! Each sectionalized unit is carefully "packaged." Nothing, except the delicate scales, has to be removed or changed for transporting. In dismantling, each section is ready to roll the minute the built-in running gear hits the ground. At the new site, the *only* available truly self-erecting mechanism quickly raises each section into place. No crane is necessary. The "packaged" sections fit together perfectly. You're back in operation almost before you know it, turning out exact-specification material. There are no costly relocation delays to nibble away at your season's per-ton profit. Add in the many other Cedarapids Bituminous Mixing Plant benefits in the complete line of both portable and stationary batch-type plants or continuous-mix plants. Ask your Cedarapids Dealer to prove that no other make can match them for profitable production.



**NEW CAT DW20** 4-wheel, 345 HP Series G Tractor with 24 cu. yd. No. 482 Scraper



**NEW CAT DW21** 2-wheel, 345 HP Series G Tractor with 19.5 cu. yd. No. 470 Scraper



**NEW CAT No. 619** 2-wheel, 225 HP Series B Tractor with 14 cu. yd. No. 442 Scraper

# BIG NEW CAT WHEEL RIGS CUT PRODUCTION COSTS

You name the job...these new Cat Wheel Tractors and matching LOWBOWL Scrapers can do it better with faster cycles and greater production, at lower cost. For example:

**DW20-DW21 Series G Tractors and matching LOWBOWL Scrapers** Now these big wheel tractors develop 345 HP—an increase of 8% over former units. Both tractors have 12% more rimpull than before—the DW20 develops 39,565 lb. (maximum) rimpull, and the DW21 has 49,100 lb. (maximum) rimpull. As a result, the new rigs travel faster (up to 20%) under similar haul road conditions. To accommodate this greater power and capacity, improvements have also been made in transmission and final drive.

Matching the increased horsepower and productivity of the Series G Wheel Tractors are the new No. 456 and No. 470 Series B LOWBOWL Scrapers. Rating is increased 8% to 19.5 cu. yd. struck and 27 cu. yd. heaped. (Rating on the No. 482 is 24 cu. yd. struck and 34 cu. yd. heaped.) Bowl, draft frame and apron are strengthened for greater resistance to tough materials and rugged loading—withstand higher loading stresses.

**No. 619 Series B Wheel Tractor and No. 442 Series B LOWBOWL Scraper** Here is the latest addition to the Caterpillar line of high-speed earthmoving equipment. This brand-new earthmover is a 14 cu. yd. struck (18 cu. yd. heaped) unit featuring ground-hugging roadability, "years ahead" service-accessibility, and high productivity. The No. 619 has a turbocharged 225 HP

engine (and high torque rise), planetary final drives, unit construction, tubeless tires, a swing-away dash, 2-jack steering, and a dry-type air cleaner, providing the design and performance features that insure superior workability on a broad range of applications. All this in the new No. 619-No. 442 unit—plus proved economy over any earthmover of comparable size.

**DW15 Series F Wheel Tractor and No. 428 LOWBOWL Scraper** Greater strength and productivity in the well-known four-wheel DW15-No. 428. Bevel gear and pinion, differential and front wheel spindles offer increased service life. Machine delivers 200 HP. The big LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. Can be unhitched to haul other units.

Plan your work around these new Cat Wheel Rigs for top production at lowest cost: The DW20-DW21 Series G, the new No. 619 and the DW15 Series F. The complete facts are at your Caterpillar Dealer. Call him today for a demonstration.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

## CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH  
PROVED IN THE FIELD



**HEAVY LOADS** imposed by overpass on West Coast street location project are safely supported by new PS Co. Heavy Duty Shoring frames.

## New Frames Carry Heavy Shoring Loads

**HEAVY DUTY "Trouble Saver"** Shoring, employing a 4'-wide frame of new design, is ideal for the special conditions and heavy loads often found in present-day construction.

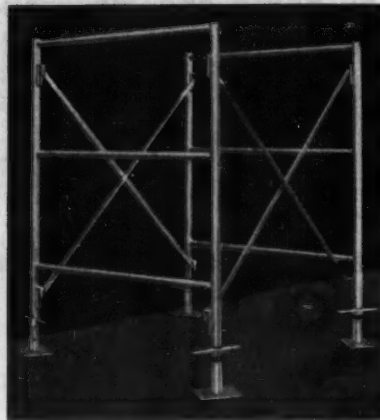
Designed in accordance with PS Co.'s high standards of safety, the frames were tested under simulated field conditions to safely support loads up to 10,000 pounds per leg. The system used for these exhaustive tests and the factor of safety used in arriving at safe leg loads are identical with those used for many years in testing standard "Trouble Saver" Shoring, so will be used throughout the country.

The new frames are manufactured in 3', 4', 5' and 6' heights. Pivoted diagonal braces provide spacings from 3' to 10'. A full line of accessories is available.

Heavy Duty "Trouble Saver" Shoring guarantees contractors the same money-saving advantages as found in standard "Trouble Saver" equipment:

**FREE-STANDING SECTIONS  
EASE OF ERECTION  
LUMBER ECONOMY  
QUICKLY ADJUSTABLE  
BUILT-IN-SCAFFOLD FOR  
FORMING & STRIPPING  
ROLLING SHORING-FORMWORK  
ENGINEERED LAYOUTS**

In addition to Heavy Duty Shoring, PS Co. has wide experience in all types of steel shoring. Because of this, PS Co. recognizes that no one type is best for all applications. For example, standard "Trouble Saver" Sectional Shoring meets the great majority of requirements of routine construction. For special, heavy duty requirements, new



**FREE-STANDING** basic section of "Trouble Saver" Heavy Duty Shoring frames. Fast acting, patented "SlideLoks" secure braces to frames.

"Trouble Saver" Heavy Duty Shoring is the answer. For extreme loads up to 40,000 pounds on each leg, PS Co.'s Extra Heavy Duty Shoring, has been used successfully by contractors.

Obviously, any shoring loads or any special conditions are no problem with PS Co.'s complete line of steel shoring equipment.

For further information on new Heavy Duty "Trouble Saver" Shoring or on any PS Co. Shoring system, call your nearest PS Co. office.

### THE PATENT SCAFFOLDING CO., Inc.

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Branches in all principal Cities

**SHORING METHODS FOR STEEL AND CONCRETE CONSTRUCTION**

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

**SALES**

**RENTALS**

# MUELLER®

*Products and people,  
dependably serving  
every water and gas  
distribution system —  
for over a century!*

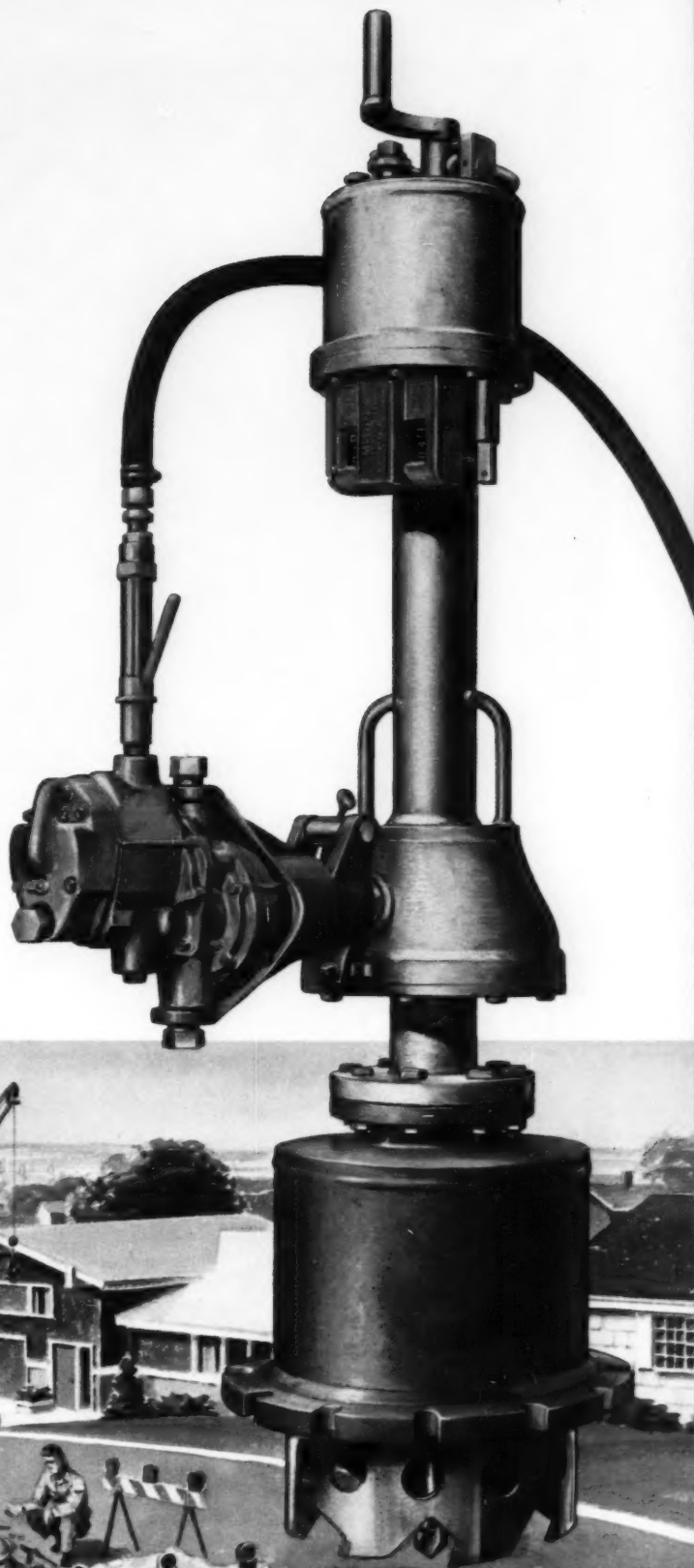
Supplying a constant flow of water and gas to your home or your industry requires highly specialized tools and equipment.

For example, this Mueller automatic drilling machine is used to drill into mains to make new connections and to add valves while the main is under pressure — *without shutting off the flow of water or gas*. The operator needs only to check the visual indicators to see how the automatic cut is progressing.

Today, because of the dependable performance of the thousands of products developed by Mueller people for the water and gas industries, the constant, safe control of gas and water is taken for granted.

**MUELLER CO. DECATUR, ILL.**

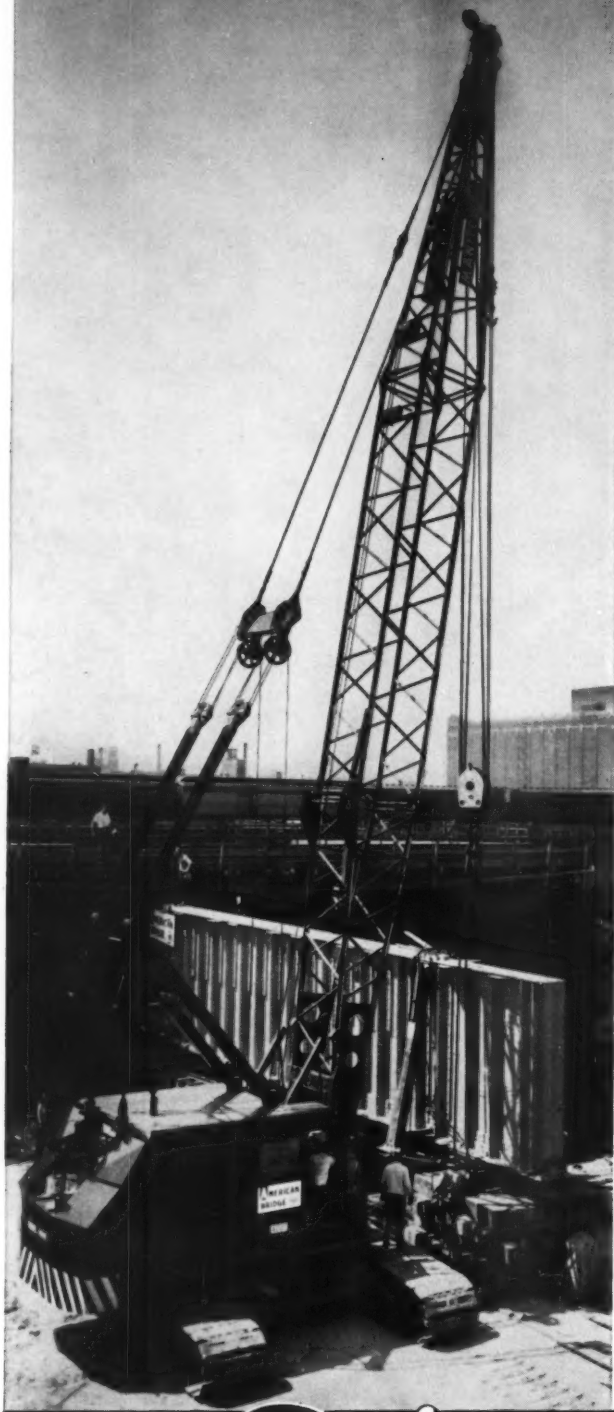
*Since 1857*



CL-12 Drilling Machine  
for cuts from 2" to 12".

# 187-TON GIRDER

SET BY THIS  
**MANITOWOC**



Backbone of a new triple-decked intersection for Chicago's Northwest Expressway is a 187 ton steel girder . . . the heaviest single piece of its type ever erected in the city. Measuring 126' x 13', this is the heaviest steel girder ever shipped in one piece by the American Bridge Division of the U. S. Steel Corp. Mounted on reinforced concrete piers, it will support 60 smaller girders. These, in turn, will support ten tracks of the North Western Railroad carried over the intersection at this point.

To handle the giant girder, American Bridge used the largest capacity crawler crane made — a 125 ton Manitowoc Model 4000. The great capacity of the big Manitowoc was a key factor on the project which entailed lifts such as 95 tons at a 25½ ft. radius. The Model 4000 was equipped with 80' of the Manitowoc "T" section style boom for the job.

Adjacent to the job site the Manitowoc crane placed the girder on two 100 ton railroad "push" cars which carried it on a special length of track to a point alongside the concrete support columns. After lifting one end of the girder in place, the big crane inched through a passageway under a temporary construction track to set the other end of the girder in place. In every respect a tough job in tight quarters.

For a detailed report on the 125 ton capacity Manitowoc Model 4000 see your Manitowoc distributor soon. Only the Model 4000 does the "impossible" by handling lifting jobs that formerly required two or more rigs. No other crawler crane can match this record!

**Manitowoc**

**MANITOWOC ENGINEERING CORP.**

(A subsidiary of The Manitowoc Company, Inc.)

**MANITOWOC, WISCONSIN**

<b>CRANES</b>	<b>SHOVELS</b>	<b>DRAGLINES</b>	<b>TRENCH HOES</b>
25 TON - 125 TON	1 ¼-YD. - 6-YD.	1 ¼-YD. - 6-YD.	1 ¼-YD. - 3-YD.

# PROTECT THE PUBLIC . . .

UTION

CAUTION



## NEW, BRIGHTER, DIETZ No. 100 CONTRACTOR LANTERN

Now, this improved lantern illuminates exact location, extent and boundaries of hazardous areas more vividly than ever. The only lantern that combines brilliance and long burning. Extra-large fount provides 75 hours of reliable operation.

PROPER LIGHTING of the highway hazard is an essential investment to protect the public, workers, and equipment, and to eliminate potential causes of costly lawsuits.

## Use the DIETZ 3-WAY HAZARD WARNING SYSTEM

Use Dietz Vis-Flash Lights to alert the oncoming driver. Brightest, safest, most trouble-free flashers on the market. Warn: "Danger ahead."

Use Dietz Lanterns to locate hazard in relation to driver's position. Show exact location, shape, extent, and boundaries of hazard area. Burn up to 75 hours.

Use Dietz Torches to guide driver around the hazard. Fully illuminate the danger in every weather. Burn up to 40 hours on low cost kerosene.



WRITE FOR THE LATEST AUTHORITATIVE MANUAL ON HAZARD WARNING LIGHTING

Go **DIETZ**  
and  
you go Safely

**R. E. DIETZ CO.**  
103 Leavenworth Ave., Syracuse, N. Y.

Please send me a copy of the Hazard Warning Lighting Manual.

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COMPANY \_\_\_\_\_  
TITLE \_\_\_\_\_  
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CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# *11% Ahead at*



Phillips (left) and Morgan (center) show Williamson how planned lubrication prevented equipment breakdowns.



Williamson (left) and Morgan go over important lubricating points of truck used on Dyberry job.

# Winter Shutdown!

## Mobil PM System Given Credit by Hunkin-Conkey for Helping Speed Up Dyberry Flood Control Dam and Reservoir Project of U. S. Army Corps of Engineers

WHEN Hunkin-Conkey Construction Company, Cleveland, O., closed down operations for the winter at the Dyberry Flood Control Dam and Reservoir near Honesdale, Pa., it was 11% ahead of job schedule. Exclusive use of the Mobil PM System and Mobil products, resulting in better maintenance organization and performance, is given a large share of the credit for this fast progress by Frank S. Morgan, Hunkin-Conkey's General Superintendent on the Dyberry job.

Major equipment in use at the Honesdale project includes 12 Euclid trucks, seven bulldozers, three mixer trucks, two tractor-mounted drill rigs, two 2½-yard shovels and a one-yard drag-line. Planned lubrication made possible the steady, day-after-day availability of this equipment—an important factor in helping Hunkin-Conkey keep ahead of schedule.

This case history clearly demonstrates the



R. G. Williamson, local Socony Mobil representative (center), checks Mobil PM System equipment sheet with General Superintendent Frank S. Morgan and Equipment Superintendent L. C. "Joe" Phillips.

practical value of Mobil's PM System and Mobil products for contractors in saving valuable job time... boosting job profits... and in keeping their equipment working on the job *all through the job!*

Available—film on equipment safety, maintenance.  
Call nearest Socony Mobil office.

### CONTRACTOR PM SYSTEM INCLUDES:

1. **Record Folder**—provides identifying data for each separate piece of equipment and holds equipment records.

2. **Operator's Recommendation Chart**—lists the correct lubrication recommendations for each piece of equipment.

3. **Weekly Service & Inspection Report**—

an up-to-date record of condition of equipment, work to be done or completed.

4. **Delivery Ticket**—lists petroleum supplies delivered to equipment on the job.

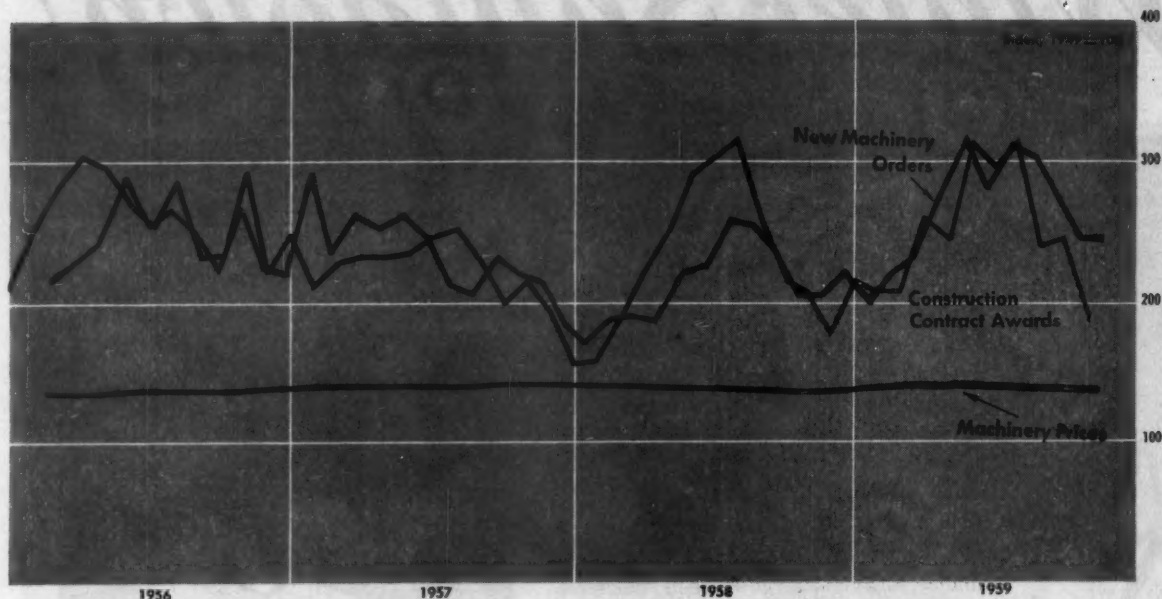
5. **"Squawk" Sheet**—used by equipment operator to point out trouble spots that may need immediate attention.



## Correct Lubrication

ANOTHER REASON YOU'RE MILES AHEAD WITH MOBIL

# Trends in the Machinery Market



## Price Index

	SEPTEMBER 1959	MONTH AGO	YEAR AGO	% CHANGE 1958-1959
All Types of Equipment .....	172.4	172.2	166.0	+ 3.9
<b>Cranes, Draglines, Shovels</b> .....	<b>170.5</b>	<b>169.2</b>	<b>165.5</b>	<b>+ 3.0</b>
Shovel, ½ cu yd .....	165.0	163.2	154.4	+ 6.9
Shovel, ¾ cu yd .....	173.9	172.5	170.3	+ 2.1
Shovel, 1-1½ cu yd .....	184.3	181.9	180.1	+ 2.0
Shovel, 2-2½ cu yd .....	164.5	162.1	155.5	+ 5.0
Shovel, 3-3½ cu yd .....	167.8	167.8	162.7	+ 3.0
Shovel, 6 cu yd .....	195.0	195.0	184.1	+ 5.9
Crane, truck mounted .....	166.2	166.2	164.2	+ 1.2
Crane, tractor mounted .....	135.1	135.1	135.1	0
Bucket, clam shell .....	157.5	157.5	152.7	+ 3.1
Bucket, dragline .....	169.3	169.3	180.8	- 6.4
<b>Scrapers and Graders</b> .....	<b>165.7</b>	<b>165.7</b>	<b>158.8</b>	<b>+ 4.3</b>
Scraper, 4 Wheel, 8-10.5 cu yd .....	155.0	155.0	155.0	0
Scraper, 4 Wheel, 12-15 cu yd .....	156.8	156.8	151.3	+ 3.6
Scraper, 2 Wheel, 15-19.5 cu yd (a) .....	123.7	123.7	122.7	+ 0.8
Grader, heavy duty .....	172.6	172.6	164.0	+ 5.2
Grader, light & medium .....	171.1	171.1	161.2	+ 6.1
<b>Tractors (non-farm, incl industrial)</b> .....	<b>187.8</b>	<b>187.8</b>	<b>180.5</b>	<b>+ 4.0</b>
Wheel-type, off highway (a) .....	128.2	128.2	128.4	- 0.2
Crawler-type, 50-74 dhp .....	191.9	191.9	182.7	+ 5.0
75-99 dhp .....	196.4	196.4	185.8	+ 5.7
100-154 dhp .....	191.3	191.3	186.7	+ 2.5
155-190 dhp .....	201.3	201.3	191.8	+ 5.0
<b>Machinery, Tractor Mounted</b> .....	<b>168.8</b>	<b>168.8</b>	<b>161.7</b>	<b>+ 4.3</b>
Dozer, cable controlled .....	154.4	154.4	151.6	+ 1.8
Dozer, hydraulic controlled .....	186.6	186.6	177.3	+ 5.2
Cable power control unit .....	151.4	151.4	147.9	+ 2.4
Loader, shovel type .....	161.5	161.5	153.9	+ 4.9
<b>Specialized Machinery</b> .....	<b>157.3</b>	<b>157.0</b>	<b>150.7</b>	<b>+ 4.4</b>
Ditcher .....	156.6	156.6	154.7	+ 1.2
Roller, tandem .....	220.2	220.2	193.2	+14.0
Roller, 3 wheel .....	174.9	174.9	161.6	+ 8.2
Ripper and rooter .....	150.5	150.5	143.3	+ 5.0
Dewatering pump, 10 M gph .....	110.3	110.0	111.7	- 1.3
Dewatering pump, 90 M gph .....	151.0	150.5	144.3	+ 4.6
<b>Portable Air Compressors</b> .....	<b>167.5</b>	<b>167.5</b>	<b>159.1</b>	<b>+ 5.3</b>
<b>Contractor's Air Tools</b> .....	<b>181.6</b>	<b>181.6</b>	<b>164.6</b>	<b>+10.3</b>
<b>Mixers, Pavers, Spreaders</b> .....	<b>156.2</b>	<b>156.2</b>	<b>150.1</b>	<b>+ 4.1</b>
Mixer, portable, 11 cu ft .....	165.9	165.0	160.1	+ 3.6
Mixer, portable, 16 cu ft .....	172.2	171.0	163.7	+ 5.2
Mixer, truck, 6 cu yd .....	132.4	132.4	127.3	+ 4.0
Mixer, paving, 34 cu ft .....	193.5	193.5	183.9	+ 5.2
Concrete finisher & spreader .....	190.4	190.4	181.5	+ 4.9
Bituminous distributor .....	122.3	122.3	122.4	- 0.1
Bituminous spreader .....	170.2	170.2	160.3	+ 6.2
Bituminous paver .....	159.3	159.3*	153.0	+ 4.1
<b>Off-Highway Trucks, Wagons (b)</b> .....	<b>101.1</b>	<b>101.1</b>	<b>99.9</b>	<b>+ 1.2</b>
Contractors off-highway truck (b) .....	101.1	101.1	99.9	+ 1.2
Trailer dump wagon (b) .....	101.4	101.4	100.0	+ 1.4

\* January, 1955=100 • January, 1958=100 \*Revised  
BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49=100

## Equipment Buying Holds at High Rate

Contractors ordered as much new equipment in September as in August. The New Orders Index held at 270, based on 1949 dollar volume as 100, according to the McGraw-Hill Economics Department.

Just by standing still, September orders set a new high for the month. They topped the figure of a year ago by 19%. However, they were 20% less than the 1959 peak reached in May.

The trend in equipment buying reflects closely the movement in contractors' new business. The September Contract Awards Index of 245, based on 1949=100, was slightly higher than August and 18% more than a year earlier.

### October Contracts Plummet

By contrast with September, contract awards fell sharply last month to the lowest October rate since 1954. The weekly average of \$299 million reported by *Construction Methods* is the lowest this year.

This drops the Contract Award Index to 190. A three-way squeeze on contractors' new business during October was due mainly to:

- Tight money—money to finance construction is harder to find and costs more to borrow. This is hurting mass housing and commercial building as well as some state and local public works.

- The prolonged steel strike is probably behind the drop in industrial building contracts and is forcing postponement of other work until next year.

- Cutbacks in federal aid for highways, and the new controls on the rate at which states can use it, pulled road awards in October down to only half the year-ago volume.



POWERGRIP "TIMING" BELT

## Why Reo's new ready-mix truck (with a flywheel power take-off)



...is equipped with PowerGrip "Timing" Belt



Reo's\* new transit mix truck has a revolutionary new fly-wheel power take-off. This does away with a separate engine or a take-off from the front end to truck engine crankshaft. Reo's take-off is factory designed, and engineered and installed as an integral part of the chassis engine drive. It is at the rear of the engine, ahead of the transmission. Only U. S. Rubber's PowerGrip "Timing"® Belt can deliver the positive, smooth, direct, even-flowing power desired by Reo's engineers. PowerGrip "Timing" Belt eliminated the need for lubricants and the possibility of oil leaks. This

positive drive belt is an essential, functional part that helps bring to the transit mix operator a payload increase from 400 to 600 lbs. per trip.

The efficiency and the freedom from maintenance that U. S. Rubber's PowerGrip "Timing" Belt has brought to this new revolutionary Reo drive has been demonstrated repeatedly on original equipment and replacement drives. Your U. S. Rubber distributor and "U. S." transmission engineers stand ready to help you with any transmission replacement or design problems.

\*Div. of White Motor Co., Lansing, Michigan



Mechanical Goods Division

# United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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In Canada: Dominion Rubber Company, Ltd.

# 3 HIGH-PRODUCTION CAT

**BIG NEW**  
**No. 14**  
150 HP—29,280 lb.



**IMPROVED**  
**No. 12**  
115 HP—23,115 lb.



**IMPROVED**  
**No. 112**  
75 HP—20,805 lb.



# MOTOR GRADERS...to fit any job!

HERE THEY ARE—Caterpillar's three modern, heavy-duty Motor Graders. Each is designed to outwork any machine of comparable size. Each is ruggedly built to deliver unequaled availability under the toughest conditions. Pick the one that meets your job needs—and you can count on it to do a whale of a job for you.

**The No. 14**, the industry's first and only Turbocharged Motor Grader, is the most versatile BIG grader ever developed. It operates at the highest practical working speeds with either a 12-foot or 14-foot moldboard. Built to handle the biggest jobs, it will deliver profitably for you on many applications. For example:

**1. Power Applications** like heavy grading, heavy ditching, rough grading and bank sloping.

**2. Control Applications** like light spreading, surface maintenance, fine grading and light blading.

**The No. 12**, known for more than 20 years as the "standard of the industry," has recently been improved to increase its superiority over similar-size graders. Here are some improvements that contribute to its greater capacity:

**1. Clearance** between the top edge of the blade and bottom edge of the circle has been increased to provide improved rolling action, allow more material to move across the blade.

**2. Blade Thickness** has been increased and blade beams have been increased in length and thickness to handle heavier loads.

**3. New Mechanical Controls** for reduced kickback, easier engagement.

**4. New Blade Controls** feature a positive mechanical lock—exclusive with Caterpillar. When control is in neutral, the power shaft is locked by a set of gear teeth to prevent creeping.

**The No. 112** has also been improved recently—including the new blade controls mentioned above. Use the No. 112 on smaller jobs—none can touch it for efficient performance!

These are just some of many features that put Cat Motor Graders out front with higher production at lower operating cost. For the complete picture, see your Caterpillar Dealer. Ask him to demonstrate—just say when and where, he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

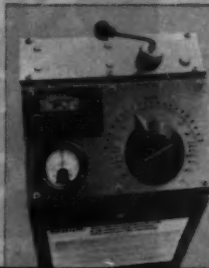
## CATERPILLAR

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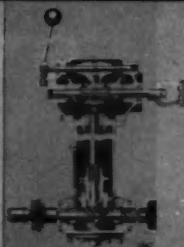
**MODERN  
HEAVY-DUTY MACHINES  
TO FIT ANY JOB!**

### HIGH-PRODUCTION FEATURES OF CAT MOTOR GRADERS!

**PRECIO AUTOMATIC  
BLADE CONTROL** Optional. Exclusive for Caterpillar Graders, improves performance on a wide range of applications. Operator selects desired slope on dial. New transistorized for freedom from maintenance and adjustment, the unit automatically maintains blade slope within  $\frac{1}{8}$  inch in 10 feet.



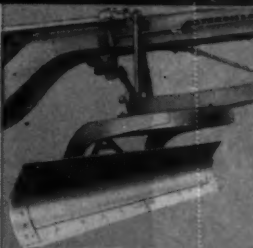
**MECHANICAL BLADE  
CONTROLS** Standard. Exclusive, new Caterpillar mechanical blade controls ease engagement, provide precise blade adjustment and reduce kickback. "Anti-creep" lock makes blade stay put under load. Another plus: Operator, while seated, has unobstructed view of job.



**NEW DRY-TYPE AIR  
CLEANER** Most efficient air cleaner ever developed. Removes 99.8% of all dirt from intake air during every service hour. Can be serviced in five minutes. Cuts maintenance time (by as much as 70%) and substantially reduces costs. Extends engine life.



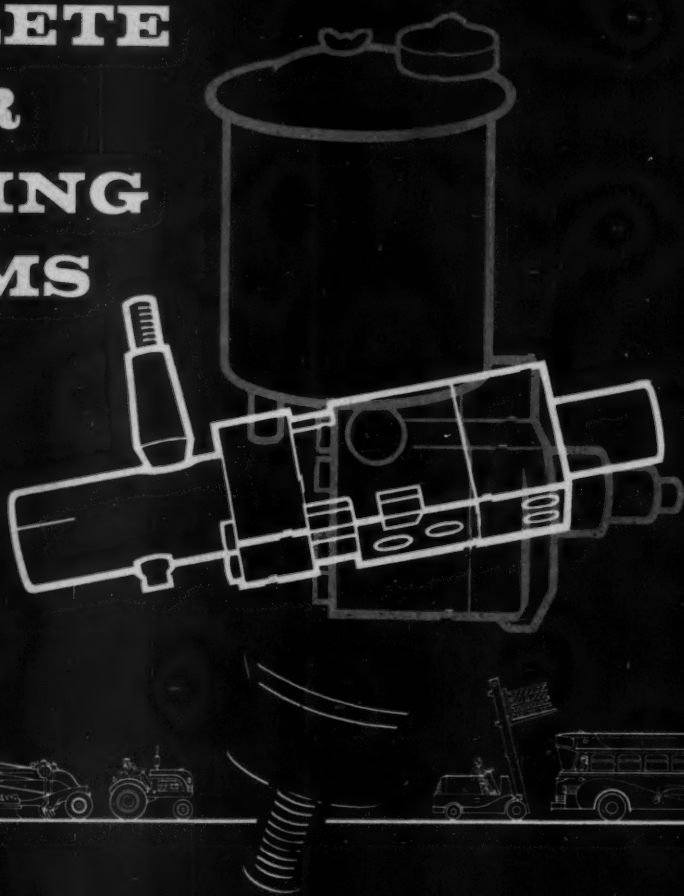
**AMPLE THROAT  
CLEARANCE** New design on the No. 14 and No. 12 permits increased clearance between moldboard and circle for maximum loads. Extra strength is built into frame, drawbar and circle to match engine power, absorb the punishment of rough work and assure accurate blading.



**OIL CLUTCH** Both the No. 14 and No. 12 are equipped with the most advanced clutch design in the industry—proved by millions of hours of use. Provides up to 2,000 hours' service without adjustment, the equivalent of about 12 months of "adjustment free" operation. Virtually eliminates down time for clutch repair.



**ONLY  
OFFERS  
NEW AND  
COMPLETE  
POWER  
STEERING  
SYSTEMS**



**Complete System Responsibility**

**VANE PUMPS FOR  
BEST OPERATION**

The Vickers power steering system utilizes vane pumps designed and built to last much longer than other type pumps. Further, they exert virtually no load on the starter like gear pumps do on those cold morning starts.

**WORLDWIDE STOCKS AND  
INTERCHANGEABILITY**

If part of your production goes into export, or if you manufacture abroad, consider this: Vickers products are built in plants throughout the free world . . . and all parts from all plants are completely interchangeable. Wherever your equipment is working, there are Vickers parts nearby.

**FOR ALL  
THE DATA ...**



New bulletin gives complete information on this important breakthrough in power steering design and manufacture. It contains dimensions, ratings and other data so you can draw your own comparisons. Write for Bulletin M5110.

# For axle loadings from 1,500 lbs. to 128,000 lbs.

Manufacturers of mobile equipment can now install a completely tailor-made power steering system using standard, production built components. These components are designed to occupy less space because of compact design and high pressure operation (up to 2000 psi). Size for size you get double the thrust for equivalent price.

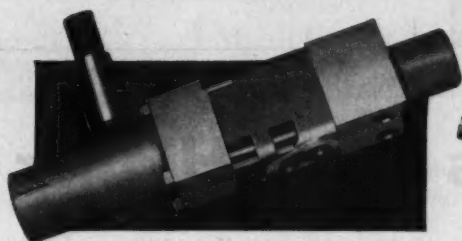
There are other advantages, too. Your engineering and manufacturing costs are substantially reduced since for all vehicle models you have a matching standard system. Your inventory is reduced because fewer parts are

needed and all parts are interchangeable... field service is simplified, speeded, too. These parts are all of the same well-engineered construction providing uniform performance and service.

All cylinders are double walled eliminating functional damage to cylinder walls by flying debris, a common hazard.

In addition, when you deal with Vickers you are dealing with a pioneer in power steering... a company that maintains a staff of specialists in power steering to serve you. AND, you get the *complete* system from one source... Vickers, the name that *makes* the news in fluid power.

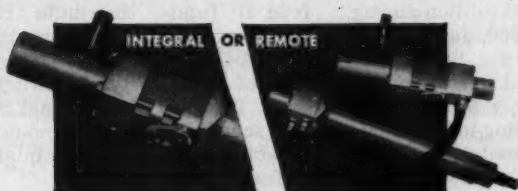
## FOR ANY VEHICLE HERE'S HOW SIMPLE IT IS



1. You take this **ONE** valve



2. One of **FOUR** cylinders



3. Connect them like this



4. Add one of three pumps

and you have **TAILOR-MADE** **VICKERS®**  
**POWER STEERING** with **STANDARD**  
**PRODUCTION-BUILT COMPONENTS**

8162

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DIVISION OF SPERRY RAND CORPORATION

Mobile Hydraulics Division

ADMINISTRATIVE and ENGINEERING CENTER

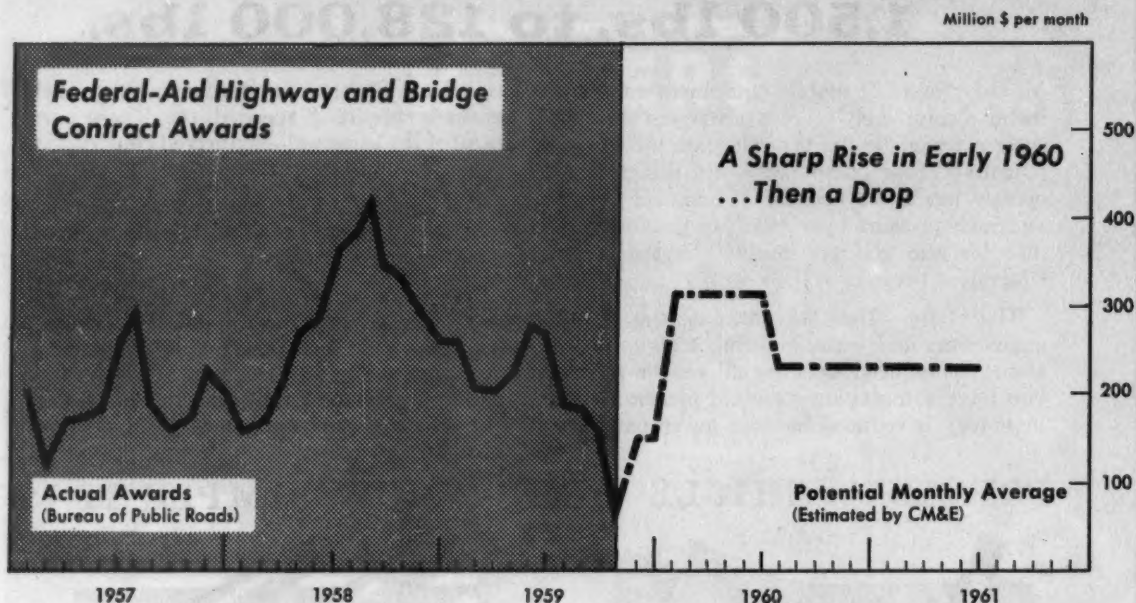
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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

# Costruction Business ...



## Highway Awards Head Higher

THE FIRST HALF of 1960 could break all records for federal-aid highway and bridge contracts. This is because the state highway departments can use two-thirds of their total federal aid funds for fiscal 1960 in this six months period.

If the states use up all of the available federal funds in the January-June period, contracts for federal-aid projects could shoot up to a monthly average of about \$310 million per month.

That's the potential estimated by *Construction Methods*. The estimate assumes the states will use two-thirds of their obligation total for interstate highways and bridges, the other one-third for "ABC" projects. The estimate also assumes that 74% of the total funds obligated by the highway departments, including state matching money, will go for construction with the other 26% going for purchase of right-of way and for engineering.

Construction contract potentials for each state in fiscal 1960 as a whole are shown in the table on the following page. Total highway and bridge contracts will be higher because the figures in the table represent the potential for federal-aid projects only.

Though contract awards for interstate and "ABC" system projects could double their September volume of \$161 million during the first half of 1960, awards will remain low for the balance of 1959. The potential for November and October is only \$155 million per month, according to *Construction Methods* estimates.

For fiscal 1960 as a whole, the potential total of federal-aid awards is \$2.8 billion. This is far below the actual total of \$3.5 billion awarded during fiscal 1959, which ended last June 30. However, the first six months of 1960 could see a record of \$1.9 billion in awards for this period because of the unbalanced quarterly schedule worked out by the Bureau of Public Roads for the states to use in obligating available federal aid.

By contrast with the first half of 1960, the awards potential for the July-December period of 1960 (and also for the first half of 1961 which makes up the balance of fiscal 1961) drops to about \$1.4 billion. This is a monthly average of about \$240 million. The estimate is based on the BPR's apportionment of \$2.75 billion in federal aid funds to the states for fiscal 1961, which translates into

a total of a little over \$2.8 billion in actual construction contracts if—the states use all available federal funds, distribute two-thirds to interstate and one-third to "ABC" projects, and obligate 74% of the total for construction costs. This also assumes that BPR will schedule an equal amount to be obligated during each quarter of fiscal 1961.

The estimated contract potential for each state may exceed or fall short of actual contracts depending upon whether the state can dig up enough matching funds to take full advantage of available federal aid. Some states may not be able to obtain enough of their own cash. And some may let more than two-thirds of their available obligations for interstate projects, which would pull their contract totals below the estimated potential because states match \$10 with every \$90 in federal funds used for interstate construction, whereas they match each federal dollar used for "ABC" projects.

BPR has given the states a formula for figuring out their own quarterly schedules for obligating federal aid funds during fiscal 1960. This is a little different from the original formula prepared by BPR because it didn't send the

# SPECIAL REPORT TO CATERPILLAR OWNERS



## CATERPILLAR PARTS ASSEMBLY EXCHANGES LET YOU TRADE DOWN TIME FOR MORE GO TIME



Here's news about the time-saving, money-saving plan offered by your Caterpillar Dealer. It works this way:

1. Place your order for a parts exchange assembly that is available from dealer stock.
2. Remove your worn assembly and install the reconditioned unit.
3. Send your machine back to work and return the worn unit for credit.

Do-it-yourself repairs to parts assemblies must be weighed against earning losses. What would your equipment earn for you during the extra time it takes to repair parts assemblies? You can eliminate earning losses of this type and still pay no premium. Your equipment can actually be making money for you, when otherwise it would be down.

Cat assembly exchange units are guaranteed by your Caterpillar Dealer and can be ready to go on just as soon as the worn assembly is off. The cost? The cost compares favorably with the actual cost had you done the repair work yourself—often less because of the availability of special equipment and serviceman's skill in your dealer's shops.

You can exchange with confidence. When you purchase a Caterpillar Exchange Assembly, you can be sure it's been reconditioned by trained experts using authorized techniques, and only genuine Caterpillar parts are used. Every assembly exchange item is backed 100% to be in first-class condition.

Any way you look at it, Cat Parts Assembly Exchange is a good deal. You get a dependable, guaranteed exchange unit at approximately the same cost had you done the job yourself—and the time saved can be converted into cash by having your machine working and earning. Contact your dealer today for his list of Parts Assembly Exchange Units and prices.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

### EQUIPMENT RENTAL AVERAGES DURING 1958\*

as compiled by Associated Equipment Distributors

CRAWLERS	PER DAY		MOTOR GRADERS	PER DAY
	DIRECT DRIVE	TORQUE CONVERTER		
D9	\$296.00	\$386.00	No. 14	\$138.00
D9 w/No. 9A Dozer	367.00	457.00	No. 14 w/Scarifier Attach.	149.00
D9 w/No. 491 Scraper	497.00	507.00	No. 12	117.00
D8	211.00	330.00	No. 12 w/Scarifier Attach.	125.75
D8 w/No. 8A Dozer	270.75	398.25	No. 112	93.00
D8 w/No. 463 Scraper	366.00	485.00	No. 112 w/Scarifier Attach.	110.85
D7	142.00		WHEEL TRACTORS	
D7 w/No. 7A Dozer	188.25		w/2-WHEEL SCRAPER	
D7 w/No. 435 Scraper	265.00		DW21-No. 470	\$382.00
D6	107.00		DW20-No. 456	482.00
D6 w/No. 6A Dozer	148.50		DW15-No. 428	205.00
D6 w/No. 60 Scraper	179.75		TRACTOR LOADERS,	
D4	74.75		FRONT END LOAD and DUMP	
D4 w/No. 4A Dozer	109.50		No. 977	\$199.00
D4 w/No. 40 Scraper	113.40		No. 955	108.00
			No. 933	85.75

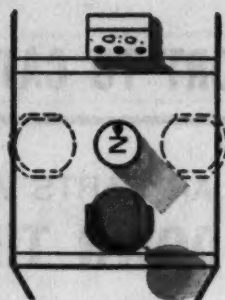
\*Figures are national average rates and in no way reflect the going rate in any area, and cannot be so used. Actual rental costs vary depending on local practices and conditions.

### SERVICE TIP

BEFORE you begin to tear down your equipment to remove a parts assembly, check with your Caterpillar Dealer on availability and delivery. The big advantage of Parts Assembly Exchange is in having the reconditioned unit ready to go on as soon as the worn one is off.

## CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

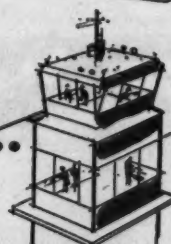


Three quickly adjustable bucket seat positions provide excellent operator visibility

## Airport Control Tower Visibility...

Seaman-Andwall

# STA-BILT Steel Wheel ROLLERS



Multi-position, comfortable bucket seat on top of roller provides 360° operator vision from any one of 3 positions — ahead, behind and at both sides. It's a big feature that insures better, faster, more accurate work — especially in close quarters.

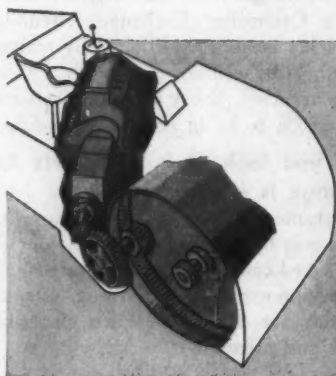
And the unique Direct-In-Line Power Train eliminates power-robbing jackshafts, countershafts, chains, belts or right angle drives... positive power, high efficiency and low fuel

consumption at all times. All access doors can be locked... direction and acceleration from one control.

Engineered in two models — the 500 Series, 5-8 tons; 800 Series, 8-12 tons variable weights.

Investigate the STA-BILT rollers now. Specify them for all your steel wheel compaction — in the interest of far better work at much lower cost.

STA-BILT Steel Wheel Rollers. Built in 5-8 ton and 8-12 ton variable weights ▶

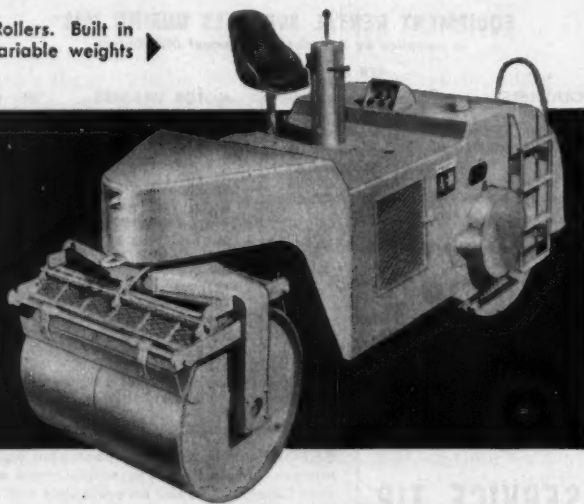


Direct-in-line Power Train — the greatest advance in roller efficiency in years



**SEAMAN-ANDWALL CORPORATION**

Elm Grove 4, Wisconsin



# CONSTRUCTION BUSINESS . . . continued

fiscal 1960 obligation schedule to the state highway departments until October 8, instead of by October 1, as planned.

Originally, each state was to obligate its October 1 unobligated balance of federal aid this way: 22% for the July-October "quar-

## Highway and Bridge Contract Potential: Fiscal 1960

Federal-aid projects only. CM&E estimates (millions of dollars)

State & Region	Obligations of Federal Funds		Chg. Potential* %	Contract Potential of Federal Aid			Chg. %
	Fiscal Year 1959	Fiscal Year 1960†		Fiscal 1960	Fiscal 1960	Fiscal 1961†	
<b>US TOTAL</b> . . . . .	<b>3,479.0</b>	<b>2,673.0</b>	<b>-23</b>	<b>2,900</b>	<b>3,383.0</b>	<b>2,646.2</b>	<b>-22</b>
<b>NEW ENGLAND</b> . . . . .	<b>224.8</b>	<b>157.9</b>	<b>-30</b>	<b>159</b>	<b>205.6</b>	<b>157.4</b>	<b>-23</b>
Maine . . . . .	26.8	15.4	-43	17	19.5	15.2	-22
N. Hampshire . . . . .	28.5	13.7	-52	14	17.7	13.9	-21
Vermont . . . . .	19.8	20.3	+3	19	27.2	20.3	-25
Massachusetts . . . . .	87.9	65.5	-25	65	85.9	65.3	-24
Rhode Island . . . . .	13.9	13.2	-5	14	16.6	13.0	-22
Connecticut . . . . .	47.9	29.8	-38	30	38.7	29.7	-23
<b>MID-ATLANTIC</b> . . . . .	<b>433.3</b>	<b>414.4</b>	<b>-4</b>	<b>429</b>	<b>531.0</b>	<b>411.5</b>	<b>-23</b>
New York . . . . .	216.3	143.4	-34	155	180.2	142.0	-21
New Jersey . . . . .	72.3	74.0	+2	72	97.7	74.0	-24
Pennsylvania . . . . .	106.5	114.4	+7	122	144.6	113.5	-22
Maryland . . . . .	17.2	49.3	+186	47	65.9	49.4	-25
Dist. Columbia . . . . .	13.0	22.7	+75	22	30.0	22.7	-24
Delaware . . . . .	8.0	10.6	+33	11	12.6	9.9	-21
<b>SOUTH</b> . . . . .	<b>755.4</b>	<b>573.4</b>	<b>-24</b>	<b>584</b>	<b>731.1</b>	<b>562.9</b>	<b>-23</b>
Virginia . . . . .	56.6	91.4	+61	86	122.6	91.5	-25
W. Virginia . . . . .	62.9	31.5	-50	32	40.9	31.4	-23
N. Carolina . . . . .	48.9	40.1	-18	47	35.2	29.7	-16
S. Carolina . . . . .	47.9	25.8	-46	29	31.9	26.3	-18
Georgia . . . . .	78.9	62.5	-21	65	80.6	62.2	-23
Florida . . . . .	90.1	60.1	-33	59	79.2	60.0	-24
Alabama . . . . .	69.4	52.2	-25	54	67.1	51.9	-23
Mississippi . . . . .	46.8	33.0	-29	36	41.5	33.6	-19
Louisiana . . . . .	90.0	60.1	-33	58	79.9	60.1	-25
Kentucky . . . . .	85.6	46.4	-46	48	59.7	46.1	-23
Tennessee . . . . .	78.3	70.3	-10	70	92.5	70.1	-24
<b>MID-WEST</b> . . . . .	<b>731.4</b>	<b>480.3</b>	<b>-33</b>	<b>496</b>	<b>633.5</b>	<b>488.5</b>	<b>-23</b>
Ohio . . . . .	227.1	149.7	-34	146	198.0	149.6	-24
Indiana . . . . .	99.5	72.0	-28	73	93.2	71.6	-23
Illinois . . . . .	187.8	129.2	-31	132	167.2	129.0	-23
Wisconsin . . . . .	73.4	38.3	-48	44	46.6	37.7	-19
Michigan . . . . .	143.6	99.1	-31	101	128.5	100.6	-22
<b>MISS. TO</b>							
<b>ROCKIES</b> . . . . .	<b>844.6</b>	<b>579.5</b>	<b>-31</b>	<b>634</b>	<b>715.2</b>	<b>565.1</b>	<b>-21</b>
Minnesota . . . . .	76.8	54.1	-30	58	68.2	54.9	-20
Iowa . . . . .	85.9	35.2	-59	41	42.7	34.6	-19
Missouri . . . . .	83.2	73.9	-11	76	95.6	73.5	-23
Arkansas . . . . .	38.5	30.0	-22	33	37.8	29.7	-21
N. Dakota . . . . .	37.6	17.2	-54	20	21.1	16.9	-20
S. Dakota . . . . .	34.4	23.2	-33	26	21.5	17.4	-19
Nebraska . . . . .	36.7	29.2	-20	33	30.1	24.3	-19
Kansas . . . . .	48.9	33.2	-32	39	40.2	32.6	-19
Oklahoma . . . . .	42.6	32.6	-23	38	39.8	32.0	-20
Texas . . . . .	202.0	131.0	-35	141	166.5	129.6	-22
Montana . . . . .	40.4	33.2	-18	36	42.5	33.0	-22
Wyoming . . . . .	32.9	26.6	-19	27	34.5	26.7	-23
Colorado . . . . .	46.7	27.5	-41	32	33.3	27.3	-18
New Mexico . . . . .	38.0	32.6	-14	34	41.4	32.6	-21
<b>FAR WEST</b> . . . . .	<b>461.2</b>	<b>412.9</b>	<b>-10</b>	<b>412</b>	<b>542.5</b>	<b>414.6</b>	<b>-24</b>
Idaho . . . . .	29.9	20.3	-32	22	26.0	20.3	-22
Utah . . . . .	42.3	24.9	-41	26	31.8	25.3	-20
Arizona . . . . .	39.5	34.7	-12	36	44.9	35.0	-22
Nevada . . . . .	29.4	16.9	-43	19	21.6	17.1	-21
Washington . . . . .	54.4	45.9	-16	47	59.7	45.9	-23
Oregon . . . . .	60.3	43.2	-28	44	56.5	43.3	-23
California . . . . .	205.4	227.0	+11	218	302.0	227.7	-25
Alaska . . . . .	15.2	36.0	+137	53	13.8	36.7	+166
Hawaii . . . . .	5.8	4.1	-29	6	4.1	3.9	-5
Puerto Rico . . . . .	7.3	6.2	-15	12	6.3	6.0	-5

† After deduction of repayable advances to the states who borrowed federal money to help match special "D" funds available in '58.

\* Based on states obligating all available federal funds and distributing two-thirds to interstate, one-third to "ABC" projects. Construction contracts estimated at 74% of total obligated, including state matching funds.



### RICHMOND

**HANGERS**  
for decks

**SCREDS**  
for decks

**TYSKRUS**  
for walls

**REINFORCING BAR SUPPORTS**  
for steel support

**SCREW ANCHORS**  
for false-work support brackets

**CONTINUOUS-THREADED LAGSTUDS**  
for columns and utility use

## Most Thruway Contractors use Richmond Products

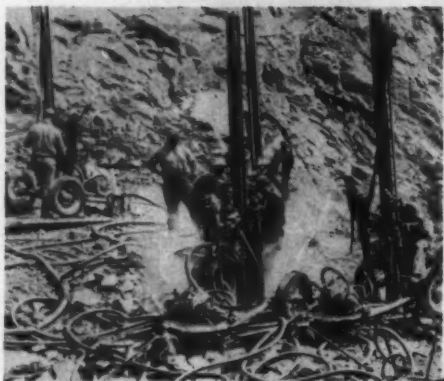
In the roadbuilding field, where time is money, concrete contractors rely on Richmond to save both. Richmond products are often a major factor in the profit and loss picture.

You buy 48 years' experience when you specify Richmond products. The current Handbook fully describes the entire Richmond line. Write for it, to:



Main Office: 816-838 LIBERTY AVE., BROOKLYN 8, N.Y.  
Plants & Sales Offices: Atlanta, Georgia • Ft. Worth, Texas • St. Joseph, Missouri • In Canada: ACROW-RICHMOND LTD., Orangeville, Ontario.

# On Jobs Like This "SUBWAY" Stands up Longer!



**THE TOUGHER  
THE SERVICE  
THE BETTER  
IT SERVES...**

**RED  
COVER**



**YELLOW STRIPE**

**"SUBWAY" AIR HOSE...** famous for strength and durability on rock drilling, pavement breaking and all other heavy-duty air tool jobs. Lightweight—extremely flexible—easy to handle. Dragging over rough terrain, in all kinds of weather, holds no hazards for its tough red cover. Sizes  $\frac{1}{2}$ " to  $1\frac{1}{4}$ ", I.D.

**"If it's GOODALL, it MUST be Good!"**

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Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING  
AND OTHER INDUSTRIAL RUBBER PRODUCTS

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GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.  
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## CONSTRUCTION BUSINESS...

*continued*

ter"; 11.3% in the November-December "quarter," and 33.3% in each of the next two quarters, January-March and April-June.

The new schedule is figured on this basis: 6.8% of the October 1 unobligated balance may be obligated in October; 13.2% in November-December; and 40% in each of the two succeeding quarters.

However, some states had already overshot the October quota when they received the BPR schedule. So they work out their schedule this way: no more was obligated in October; 14.2% of the unobligated balance may be obligated in November-December; and 42.9% in each of the next two quarters.

### SOME BIG CONTRACT AWARDS OF THE MONTH

**American Machine & Foundry Co.**, 261 Madison Ave., New York, N.Y. Construct and test 18 underground launching installations for Titan missiles at Lowry Air Force Base, Denver, Colo. Air Material Command, Ballistic Missile Center, Inglewood, Calif. \$42,600,000.

**Panama, Inc.**, c/o Tennessee Bldg., Houston, Tex. Construct 118 mi of 30-in. gas line in La., Miss., Tenn., and Ky. Trunkline Gas Co., 5650 Kirby St., Houston, Tex. \$8,900,000.

**Great Lakes Dredge & Dock Co.**, 228 N. LaSalle St., Chicago, Ill. Dredge the area of Round Island Shoals on the St. Mary's River near Sault Ste. Marie, Mich. Corps of Engineers, 1101 Washington Blvd., Detroit, Mich. \$6,464,940.

**F. E. Young Construction Co.**, 2141 Main St., San Diego 12, Calif. Erect a 13-story steel frame office building with adjoining five story garage in Los Angeles, Calif. Harrison-Harrison, Inc., 2141 Main St., San Diego 12, Calif. \$6,200,000.

**Daniel Construction Co., Inc.** Greenville S. C. Construct a research laboratory at Chapel Hill, N.C. Chemstrand Corp., 350 5th Ave., New York, N.Y. \$5,000,000.

## ENGINEER'S FIELD REPORT

**CHEVRON PRESSURE PRIMER SYSTEM**  
**JONES-TOMKINS CO.**  
 Cougar, Washington

# Special cartridge fires giant diesel in seconds



At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this \$51,000,000 project.

Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



**Chevron Pressure Primer Discharger** mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."



TRADEMARKS "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.  
**STANDARD OIL COMPANY OF CALIFORNIA**, San Francisco 20  
**THE CALIFORNIA OIL COMPANY**, Perth Amboy, New Jersey

### Why Chevron Pressure Primer System assures fast starts

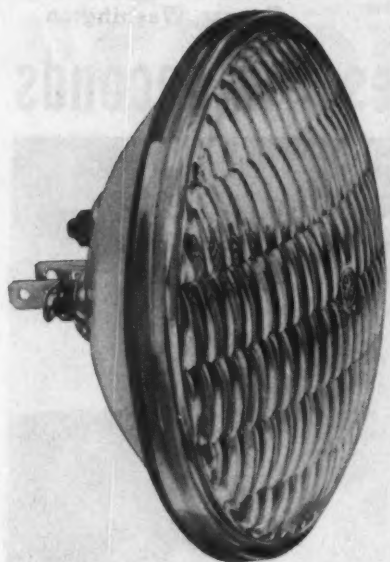


- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at -65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

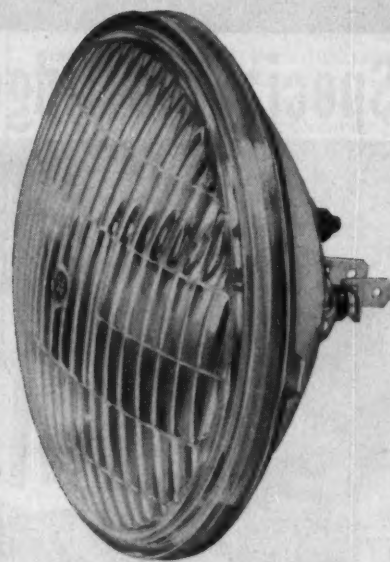
**For More Information** or the name of your nearest distributor, write or call any of the companies listed.

**STANDARD OIL COMPANY OF TEXAS**, El Paso  
**THE CALIFORNIA COMPANY**, Denver 1, Colorado

When your equipment is on the go 24 hours a day



...you  
need  
G-E C.I.M.  
lamps



- \*Flat, Far-Reaching Beam
- \*All Glass Construction
- \*6, 12 and 24-Volt Sizes
- \*Won't Shatter When Spattered
- \*No Inner Bulb To Blacken

**FLOODLAMPS** to illuminate the work area...



**DRIVING LAMPS** to light up the highway ahead...



G-E No.	Circuit Volts	Watts	Bulb Dia.
4078	6	50	5 $\frac{3}{4}$ "
4478	12	60	5 $\frac{3}{4}$ "
4578	24	60	5 $\frac{3}{4}$ "

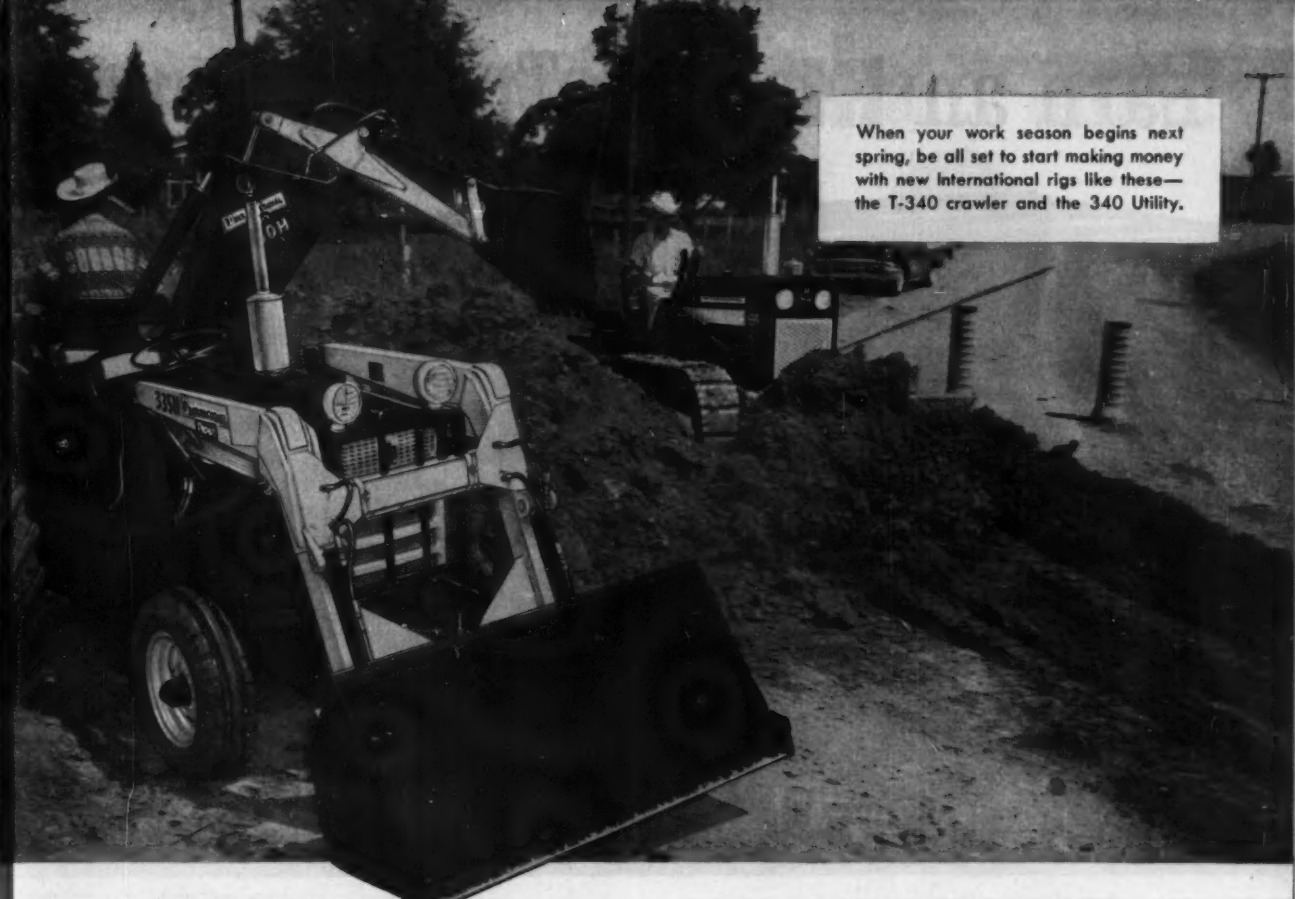
G-E No.	Circuit Volts	Watts	Bulb Dia.
4080	6	50	5 $\frac{3}{4}$ "
4480	12	60	5 $\frac{3}{4}$ "
4880	24	60	5 $\frac{3}{4}$ "

Choose and specify the General Electric C.I.M. Lamps (for Construction, Industrial and Mining Equipment) you need. See your

G-E C.I.M. Lamp supplier today! General Electric Co., Miniature Lamp Dept. M-914, Nela Park, Cleveland 12, Ohio.


*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**



When your work season begins next spring, be all set to start making money with new International rigs like these—the T-340 crawler and the 340 Utility.

## Get set for '60... your IH dealer will pay you cash to deal now!



**It will pay you to be an Early Trader!** For a limited time only, your IH dealer will pay you good, hard cash to deal NOW. By dealing now you:

- 1. Earn interest at the rate of 6% on your trade-in, payable immediately in cash.**
- 2. Earn interest at the rate of 6% on your cash payments**—either down payment or full cash settlement—**payable immediately in cash.**
- 3. Get more for your trade-in** because your IH dealer wants used equipment now, while he still has plenty of time to recondition it.
- 4. Protect yourself against possible price increases** between now and specified dates next spring.
- 5. Obtain financing on time sales** to meet your personal situation.
- 6. Assure yourself that you will get delivery of the IH industrial wheel or utility crawler tractor and equipment you need, when you need it.**

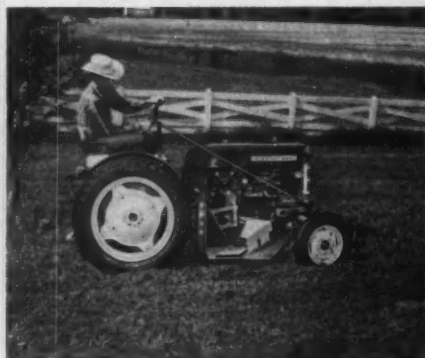
**Your IH dealer  
pays you interest  
at 6%  
on your  
down payment  
or trade-in!**

**You have the jobs... Your IH dealer  
has the power and equipment to match...**

# Earn an Early Trader's Bonus



Smooth, 6-cylinder power, combined with 4,840 pounds of built-in brawn, give you high-capacity trenching, loading, and backfilling with the 61-hp International 460 Utility.



No other tractor does so much, at such low cost, on so many types of jobs as the International Cub® Lo-Boy.® Here it is with 60-inch International Danco rotary mower.

From mowing to snow removal is all in the year's work for the 13.4 hp International Cub Lo-Boy. The Lo-Boy is shown below, with 54-inch IH front-mounted blade.



The husky 45 hp International 340 has the built-in strength and stamina for heavy-duty landscaping, trenching, and materials handling. It leads its power class in fuel economy, too.

It's materials handling unlimited with a heavy-duty front end loader equipped with fork lift attachment. It easily interchanges with crane boom or materials bucket.



Unusual earthmoving versatility is provided by the International Danuser Terra-Scoop with hydraulically-controlled scarifying, loading, dumping, and spreading action.

Mow an 8-foot strip, on slopes as steep as 2 to 1, at 5 mph or faster! You can do it with an International Danco center-mounted mower on the rugged IH F-460 tractor.



# on rigs like these...and many more!



**The 45 hp International Drott T-340 Four-In-One** combines a  $\frac{3}{4}$ -yd bucket, a scraper, a clamshell, and a dozer all in one machine. Handles jobs no single-purpose rigs can do.

**On wheels or tracks  
the most complete line of  
utility power and equipment  
is at your IH Dealer**

**Cash in hand can be yours** on the exact size of utility power you want, when you go to your IH Dealer for an Early Trader's Bonus deal! With seven sizes of wheel tractors, rated from 13.4 to 95 hp, and the 45-hp T-340 crawler, your IH dealer is headquarters for *job-matched* power. You don't have to pay for a bigger tractor than you need, nor slow down your jobs with an under-powered rig! For each model, there's a broad line of bonus-earning, matched equipment. Each unit-engineered machine gives top capacity, performance, and dependability with its matching International® tractor.

**You've everything to gain, nothing to lose** by having your IH dealer figure your deal *today* . . . the sooner you deal, the bigger your bonus!

**For low-cost operation**, the 38.5 hp International 240 Utility, shown with International Wagner loader and International No. 23 side-mounted cutter bar mower, is tops.

**Up to  $\frac{1}{2}$  cu yd bites speed trenching** with the big, 72 hp International 560 tractor, shown here with International Pippin heavy-duty backhoe and loader with  $\frac{3}{4}$  cu yd bucket.



**The earlier  
you trade  
the more  
you save . . .**





# Deal now...save 3 ways...

on all your 1960 utility tractor  
and equipment needs

## 1. Big cash savings now

Buy now. Collect an Early Trader's cash Bonus. Trade in used machines and collect interest at the rate of 6% for a specified period of time on the value of the trade-in and any cash payments you make. This offer good for a limited time only. The sooner you trade, the more you save.



International Cub  
Lo-Boy, 13.4 hp\*



International 140,  
28.25 hp\*



International 240 Utility,  
38.5 hp\*



International 340 Utility,  
45.25 hp\*



International 460 Utility, 61 hp\*,  
gasoline, Diesel, LP Gas



International 560, 72.5 hp\*,  
gasoline, Diesel, LP Gas



International 660, 95 hp\*,  
gasoline, Diesel, LP Gas



International T-340 Crawler,  
45 hp\*

## 2. The right size power at the right price!

Only International offers such a diversified range of utility power and equipment to meet your job needs. Power from 13.4\* to 95 hp\*, with unit-engineered equipment, insures long, dependable, full-capacity operation.

\*Maximum flywheel hp at standard sea level conditions.

## 3. Backed by the industry's quickest available service

Only International offers you such readily available help for your parts and service needs. No matter where your job is located, one of a nationwide network of 5,000 dealers is nearby. He has well-equipped service facilities, a substantial supply of parts, and factory-trained mechanics. His parts department in turn, is backed by the industry's most extensive network of factory parts depots.

**Big Early Trader's Bonus cash savings** are available NOW on all the International tractors illustrated above. You also get a bonus on International Pippin and International Wagner backhoes and loaders; International Drott T-340 4-in-1; International Danuser blades, scoops, and scraper-scarifiers; and International Danco heavy-duty, center-mounted mowers. There's an IH Dealer near you—see him now for full Early Trader's Bonus Plan details!

International Harvester reserves the right to withdraw its Early Trader's Bonus at any time, and will assume no obligation for orders executed under the plan after that date.



● IH factory parts depots  
● Each dot represents 10 dealers



See your

**INTERNATIONAL  
HARVESTER**

dealer

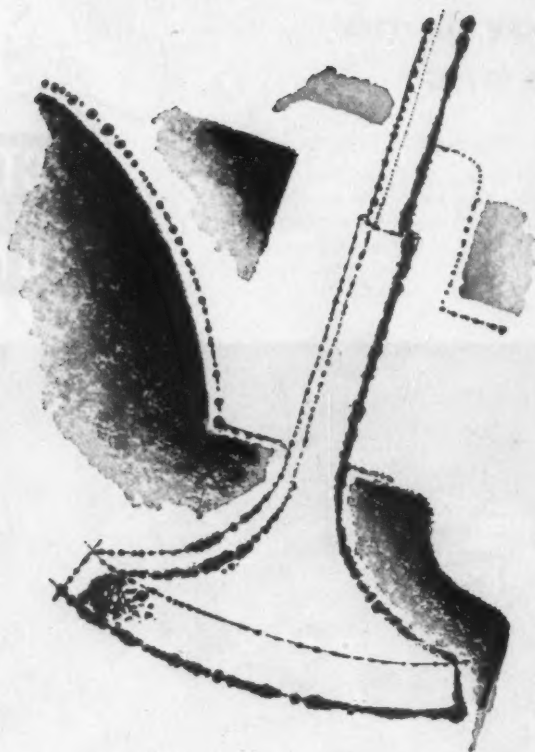
International Harvester Products pay for themselves in use... Farm Tractors and Equipment... Twine... Industrial Wheel Tractors... Motor Trucks... Construction Equipment—Chicago 1, Illinois.

**PICTURE  
OF THE  
MONTH**



## **Harnessing the Skagit**

● The diverted Skagit River roars through the low block of the first stage construction of Gorge High Dam in Washington. Hidden from view behind the structure, excavation for the second stage construction is down nearly to bedrock, about 140 ft below the old river bed. Merritt-Chapman & Scott Corp. is building the dam for Seattle City Light Co. Completion is scheduled for 1961.



## Valves... Oil... and How to Save Money

Valves which open and close hundreds of times a minute can cause lost money, time and power when deposits and wear start to take their toll. Sinclair Tenol® Oils fight deposits and wear—help keep vital parts working longer without repair. Refill with Tenol now. Next time management asks how you've cut costs, tell them you've switched to Sinclair—and show them the results.

Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.



# **Sinclair**

## **Tenol® Oils**



## "Spotty, as a digger, you just ain't got it!"

Without realizing it, Billy has hit upon a basic truth in the excavating business. To come out on top, you've got to use the best equipment for the job.

With many factors beyond a contractor's control, choosing the right equipment becomes especially important. For this is one thing a man *can* control.

That's why so many contractors choose Bucyrus-Erie. They have learned . . . as their fathers did before them . . . that B-E machines are built for more than ordinary digging. They are built to handle the toughest jobs — and still perform better.

**BUCYRUS  
ERIE**



### **MODEL CW-220**

20.0 cu. yds. **STRUCK**  
27.0 cu. yds. **HEAPED**

INTERCHANGEABLE WITH MODEL CWD-221 REAR DUMP UNIT



### **MODEL CW-215**

15.0 cu. yds. **STRUCK**  
21.0 cu. yds. **HEAPED**

INTERCHANGEABLE WITH MODEL CWD-214 REAR DUMP UNIT



### **MODEL CW-27**

7.0 cu. yds. **STRUCK**  
10.0 cu. yds. **HEAPED**



### **MODEL CW-320**

20.0 cu. yds. **STRUCK**  
27.0 cu. yds. **HEAPED**

INTERCHANGEABLE WITH MODEL CWD-321 REAR DUMP UNIT



### **MODEL CWD-221**

21.0 cu. yds. **STRUCK**  
31.0 cu. yds. **HEAPED**

**35-TON LOAD CAPACITY**

INTERCHANGEABLE WITH MODELS: CW-220

### **MODEL CW-226**

26.0 cu. yds. **STRUCK**

36.0 cu. yds. **HEAPED**



### **MODEL CWT-20**

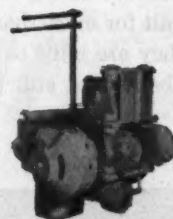
20.0 cu. yds. **STRUCK**  
27.0 cu. yds. **HEAPED**

INTERCHANGEABLE WITH MODEL  
CW-320 SCRAPER UNIT



### **MODEL CWD-321**

21.0 cu. yds. **STRUCK**  
31.0 cu. yds. **HEAPED**  
**35-TON LOAD CAPACITY**



### **CABLE CONTROLS**

for standard tractors in  
every horsepower range

# YARDS

# ON A



# S AHEAD

## ON ANY EARTHMOVING JOB ...The Curtiss-Wright Line

Let's skip the details and get down to basic facts about earthmovers. If you move more dirt, you make more money — it's as simple as that . . . and just about as easy, too, with the modern Curtiss-Wright line. C-W design features for high performance, easy operation and low maintenance put you yards ahead in production — dollars ahead in profit on any earthmoving job. Call your Curtiss-Wright distributor for complete information and specs on the machine performance matched to your job requirements.

Your local Curtiss-Wright distributor is part of a nationwide sales, parts and service network devoted to making Curtiss-Wright users the most satisfied in the industry. You can depend on him for the most efficient, most cooperative service that it is possible to provide.



AD NO. 52-60

SOUTH BEND DIVISION, CURTISS-WRIGHT CORPORATION • SOUTH BEND, INDIANA

SOUTH BEND DIVISION  
**CURTISS-WRIGHT CORPORATION**  
SOUTH BEND, INDIANA





# the **Big Buy** in air wrenches!

Compare the torque of the **SIoux** air impact wrench with any other before you buy. Model for model, price for price, size for size, **SIoux** delivers more torque . . . up to 25% more, while consuming 30% less air! **SIoux** offers more torque per dollar. More **SIoux** wrenches can be operated on the existing air supply.

## **ELECTRIC** for you?

The big buy is still **SIoux**. The advantages of **SIoux** mechanical design are available in the electric impact wrench too. You get equal power in right or left hand rotation. **SIoux** pioneered the reverse cap switch lock that prevents reversing with the current on, eliminates burned commutator brushes and switch contacts. You get **SIoux** performance and dependability too!

## **When it's a SIoux you know what it will do!**

**SIoux** tells you the torque your air or electric impact wrench will deliver. You don't buy just a wrench. You buy certified **SIoux** power! If it's a **SIoux** you know what it will do!

*Don't miss the big buy in impact wrenches  
Ask your nearest **SIoux** distributor for a demonstration!*

## **ALBERTSON & CO., INC.**

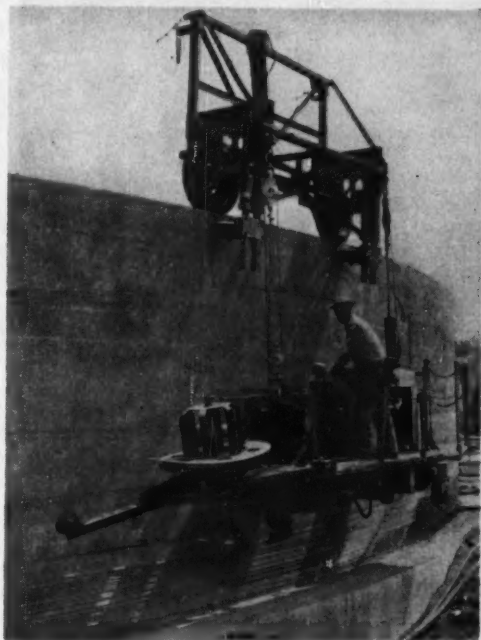
**SIoux CITY, IOWA, U.S.A.**

AIR IMPACT WRENCHES • AIR SCREWDRIVERS • ELECTRIC IMPACT WRENCHES • ELECTRIC SCREWDRIVERS • GRINDERS  
• SANDERS • POLISHERS • FLEXIBLE SHAFTS • PORTABLE SAWS • VALVE GRINDING MACHINES • ABRASIVE DISCS

# Construction News in Pictures . . .

## Circular Bank

An Insley crane swings a precast concrete roof panel into position at a new branch of the American Trust Co. in San Francisco. The building is a circle 70 ft in dia and 20 ft high. Forty panes of glass will form the wall, and there will be a skylight at the center of the roof. Haas & Haynie of San Francisco is the general contractor.

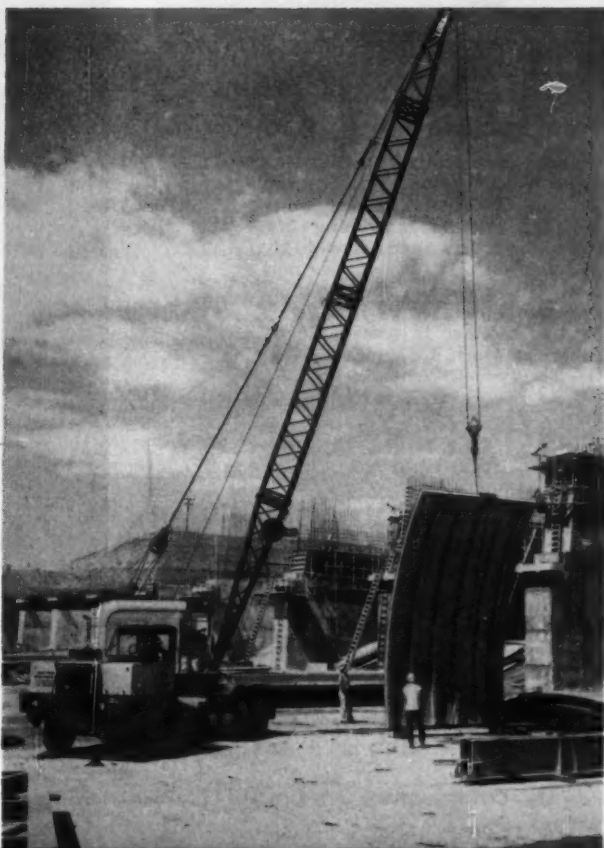


## Riding on the Roof

Wire-winding machine wraps prestressing wire around the concrete wall of a settling tank at Syracuse, N. Y. Preload Concrete Structures, Inc., is building four digesters and six settling tanks for a sewage treatment plant. Prestressed concrete construction of the structures will enable them to withstand stresses resulting from settlement.

## Nearly Completed

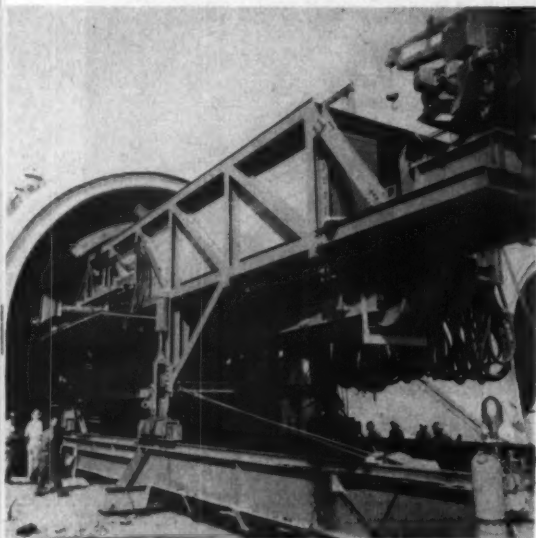
Martin K. Eby Construction Co. places a section of one of the big Tainter sluice gates at Tuttle Creek Dam with a 24-ton Lorain Moto-Crane. The big dam near Manhattan, Kans., has been under construction since 1952 and will not be entirely completed until 1961. It is 6,700 ft long and will impound 2,280,000 acre-ft of water.



## CONSTRUCTION NEWS IN PICTURES . . . continued

### Through the Building

Two guy derricks raise a massive girder 183 ft through a building to the roof. Bethlehem Steel Co. erected two girders 65 ft long in this way for a Commonwealth Edison Co. plant in Chicago. The roof-mounted derricks could not pick them from flat cars over the side of the building so they were delivered to the center of the building.

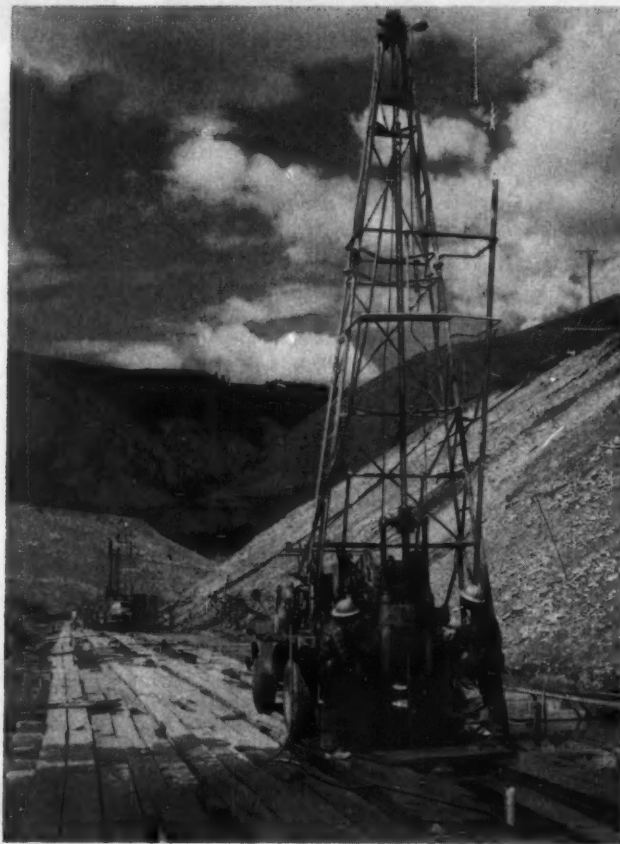
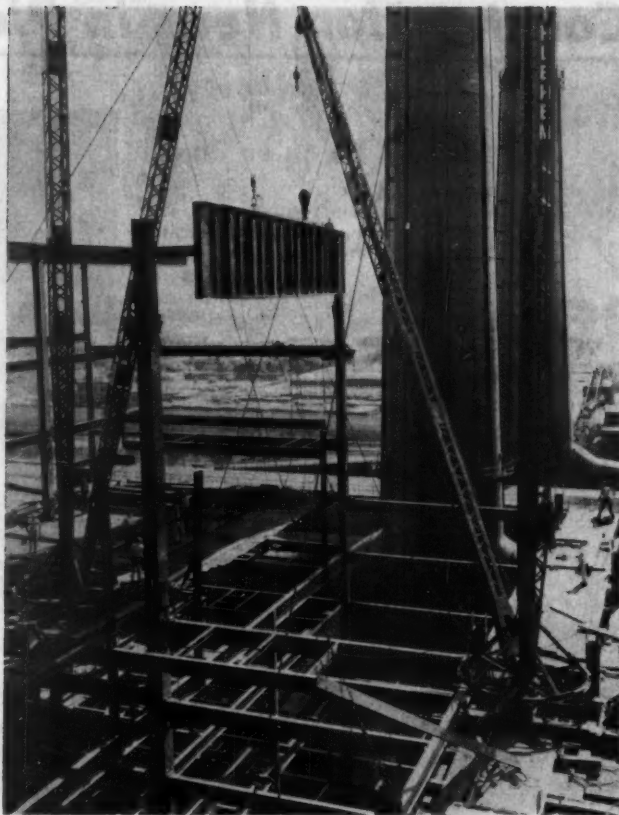


### Another Mole

Prairie Constructors is drilling seven power tunnels at Oahe Dam on the Missouri River with a specially designed continuous mining machine, the fourth such rig to go into action on that project. The new mole has a counter-rotating dual cutterhead powered by five 150-hp electric motors. It was built by American Hoist & Derrick Co.

### Grout Wall

Selby Drilling Co. of Boise, Idaho, drilled 1,081 holes and pumped in 1,068,448 cu ft of concrete grout and 56,550 cu ft of chemical grout to form a cut-off wall 2,200 ft long at Rocky Reach Dam on the Columbia River. They drilled through a thick layer of clay to place grout in a stratum of porous sand and gravel 30 to 125 ft thick.



# A New Concept in Double Reduction Truck Axles

**FIRST  
REDUCTION**  
in Bevel Gears



**SECOND  
REDUCTION**  
in Planetary

## Eaton Planetary Double Reduction

*Gives You these Important Benefits!*

**Save Weight**—Size for size, Eaton PDR Axles weigh less than conventional herringbone or spur gear axles, permit truckers to haul more legal payload.

**Last Longer**—In Eaton PDR Axles, gear tooth loads are equally distributed over four rugged "planet" gears; stress and wear are reduced, resulting in materially longer axle life. Eaton's forced-flow lubricating system provides positive lubrication to all moving parts, even at slowest vehicle speeds—a feature not available in other double reduction axles.

### Cost Less to Maintain

—When and if repairs are necessary, parts are readily available—most of them interchangeable with other Eaton Axles. Simple construction—similar to the famous Eaton 2-Speed Axle, with which all truck service men are familiar—holds maintenance labor to a minimum.

Previously, double-reduction axles have been available only in the extra heavy-duty sizes. Eaton PDR Axles are available in a wide range of sizes—the last word in equipment to meet the demands of today's hauling conditions. By actual comparison they cost less to buy, less to maintain. They have established outstanding performance records in all types of heavy-duty operation.



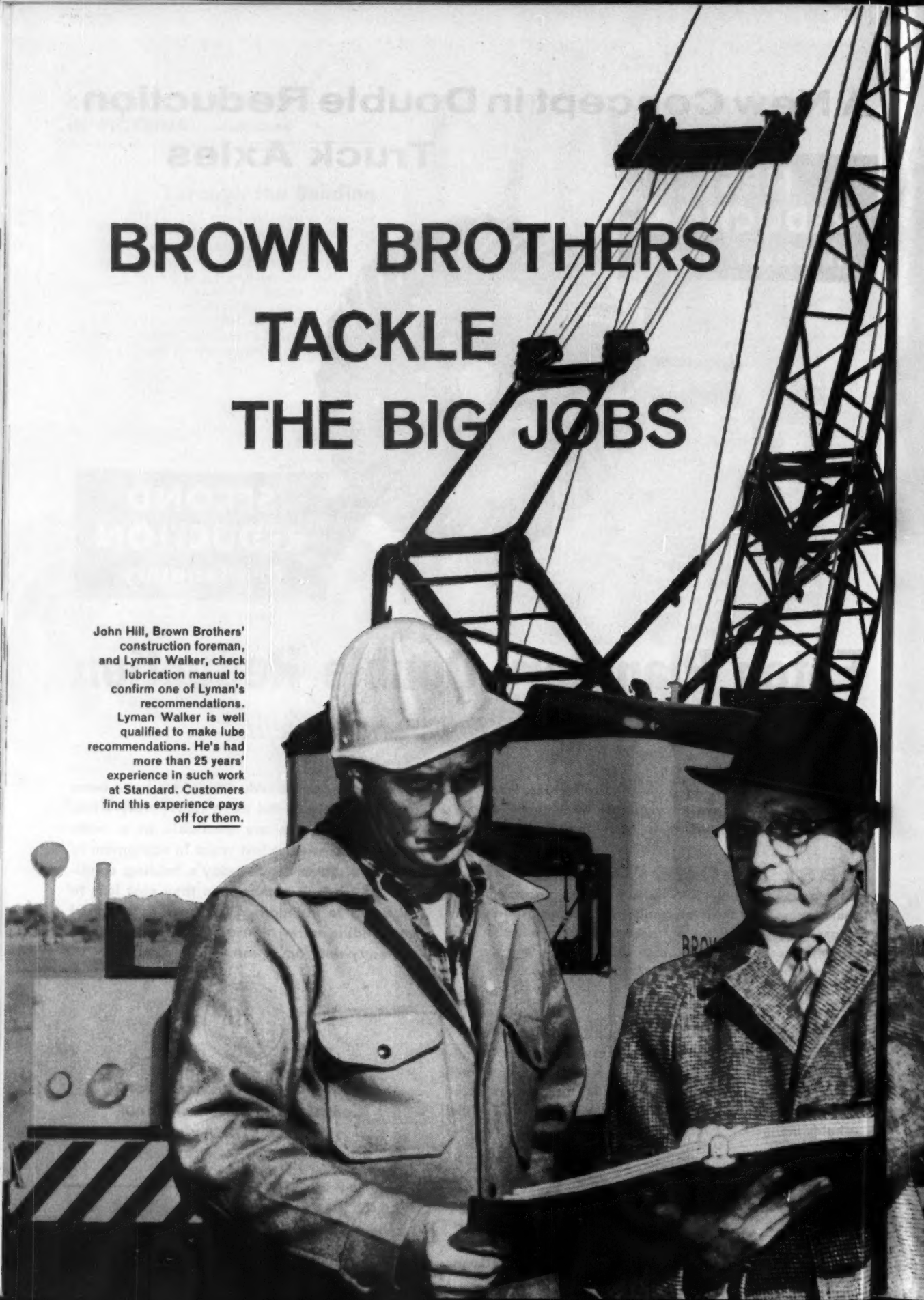
Ask your Truck Dealer for  
Complete Information about  
Eaton PDR Axles

# EATON

AXLE DIVISION  
MANUFACTURING COMPANY  
CLEVELAND, OHIO

# BROWN BROTHERS TACKLE THE BIG JOBS

John Hill, Brown Brothers' construction foreman, and Lyman Walker, check lubrication manual to confirm one of Lyman's recommendations. Lyman Walker is well qualified to make lube recommendations. He's had more than 25 years' experience in such work at Standard. Customers find this experience pays off for them.



## STANOLUBE Motor Oils and Standard Oil technical service keep equipment on the move

When Brown Brothers Construction Company, Lansing, Michigan, tackles a job, they have the equipment to do the work. Likewise, they have what's needed to maintain equipment on the toughest jobs. They use Standard Oil products and technical service. To move equipment on highways, the contractor employs a 60-ton trailer unit powered by a 300 hp GM diesel, one of the largest such units in service in Michigan. For moving dirt, Brown Brothers use Twin-Power Euclid Scrapers.

For lubrication of all of its equipment, Brown Brothers relies on STANOLUBE Motor Oils. Why? Because these motor oils are especially formulated to take the heavy duty service imposed on them.

The technical service needed to see that equipment gets the lubrication required is provided by

Standard Oil lubrication specialist Lyman Walker. Lyman has more than 25 years' experience helping customers keep equipment in service and eliminating down-time due to lubrication failure.

Get this kind of help on your job. There's a Standard Oil lubrication specialist near you anywhere in the 15 Midwest or Rocky Mountain states. Call him. Or contact **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

### Quick facts about

### STANOLUBE Motor Oils

- Made from highest quality base stock. Wax and unstable components removed.
- Detergent-dispersant additive controls severe deposit and wear problems caused by adverse fuel quality and heavy-duty conditions.
- Oxidation stability maintained and bearing corrosion controlled by special additives.
- Oil flow in all weather assured by exclusive pour-point depressant.

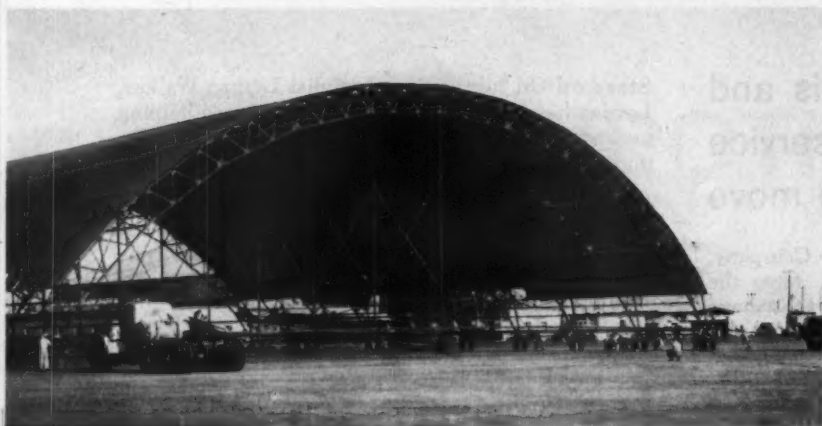
You expect more from



and you get it!



## **Construction 'Round the World . . .**

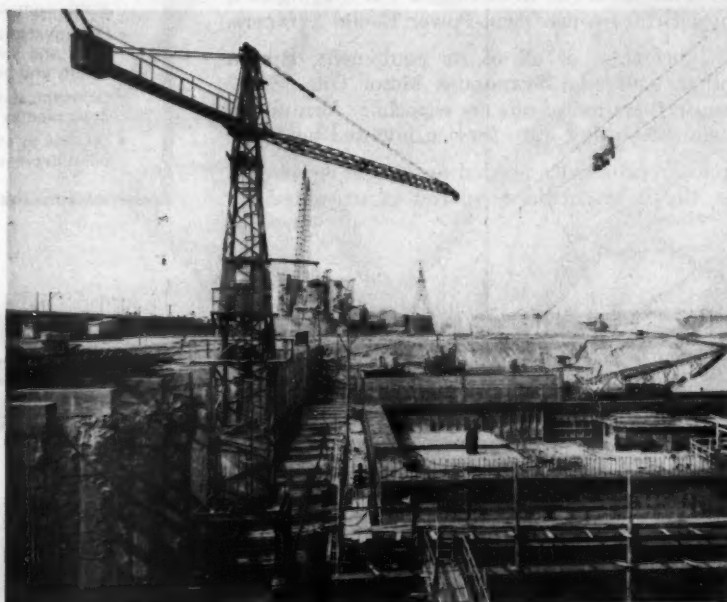


### ***In Saudi Arabia***

Contractors constructing a civil air terminal building at Dhahran Airport relocate a hangar by mounting it on wheels and rolling it to the other end of the airfield. Contractor is a joint venture of three U.S. firms: Oman Construction Co., Nashville, Tenn., R. P. Farnsworth & Co., New Orleans, La., Wright Contracting Co., Columbus, Ga.

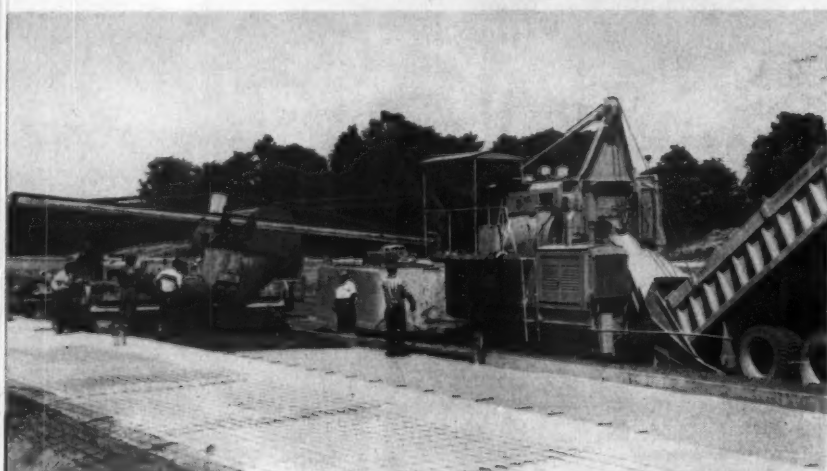
### ***In Italy***

Camsa tower crane, traveling on tracks, helps construct one of eight large caissons that will support the first hydroelectric plant on the Po River. Astrid, contractor for the project, is sinking the caissons at a maximum rate of 2 ft per day. Each 89x112-ft caisson is 35.5 ft deep. Project site is near Piacenza.



### ***In Canada***

Batch truck loads the skip while Blaw-Knox MultiFoote paver places concrete for 5-mi section of new Laurentian Toll Highway near St. Jerome. Simard & Freres, Ltd., Montreal, are using Blaw-Knox paving equipment throughout to build reinforced concrete highway. Spreader and finisher ride forms to complete paving train.



# **Your top money-maker for moving big yardages**



**28-YD  
360-HP  
30-MPH**

**B**

**TOURNAPULL®**

*...many proven operating advantages*

# For moving big yardages fast... 2

## These proven advantages make B 'Pull\* your top money-maker

**Loads Faster** ... Cutting edge of low, wide B Fullpak® scraper enters ground at 1° cutting angle. Dirt flows into bowl horizontally, with minimum lifting resistance, rolls against curved tailgate and boils forward to fill all corners of bowl and apron. Field weight-tests prove that "B" consistently carries a greater percentage of rated capacity than any other scraper in its size class.

**Hauls Faster** ... B 'Pull has the advantage of 10 forward speeds, to 30.2 mph. It has a maximum rimpull of 59,791 lbs. Exclusive power-transfer differential boosts production in soft going.

**Spreads Faster** ... With "B's" positive electric power applied to direct-action tailgate, dirt is forced out of bowl in even, low-void lifts. A single pass of the tailgate clears the bowl of even the stickiest material, avoids "carrybacks".

**Operates Easier** ... Exclusive electric controls on LW Tournapulls provide fingertip ease of operation, place power at points of action, cut friction loss, reduce downtime and maintenance. Dependable electric motors work at top efficiency in any kind of weather.

### Your top money-maker for moving big yardages

... On job after job, owners agree that today's B Tournapull is out-front in production earthmoving:

*From Illinois* ... "B 'Pulls finish jobs faster, at less cost, than any other earthmovers we've ever used."

*From Ohio* ... "B 'Pulls are easy loading, fast dumping, have plenty of power for the big jobs."

*From Oregon* ... "The 'B' is a well-built machine, with capacity and speed needed to make long hauls pay off."

*From North Dakota* ... "The 'B' just can't be beat!"

If your contracts involve big yardages, compare advantages of B 'Pull with your present equipment. See why this machine is called "top money-maker" in the big scraper field.

\*Trademark



Husky push-block on the B 'Pull is positioned low, with power-thrust in direct line from pusher to blade. This means better pusher contact, for faster, easier loading ... with minimum pusher effort.



Improved electric kingpin steer enables "B" to make 90° turns right-or-left at any speed desired. Big machine turns around in only 39'10". In extremely soft going, operator can pivot prime-mover easily from side-to-side, to "walk" the drive-wheels onto solid footing ... a superior traction advantage of B 'Pull.



Operator sits high on "B" prime-mover, with clear view of scraper, load, and pusher. With fingertip electric controls he handles all movements of bowl, apron, and tailgate. He works relaxed ... concentrates on getting big loads fast ... in even the toughest conditions.

Ask your



Distributor for all the facts

...28 yd

B

TOURNAPULL

*B Tournapull moves more dirt at lower net-cost-per-yard than any other earthmover*

with  
With  
ove-  
works  
oods

# You're in business for more profit with a full "B-size" fleet



Interchange B FULLPAK scraper for B REAR-DUMP when you hit rock. Same efficient prime-mover powers both.



Speed your scattered bulldozing, cut compaction costs . . . with heavy-duty 218-hp rubber-tired TOURNACTRATOR®.

YOUR **LW** DISTRIBUTOR IS A GOOD MAN TO KNOW



Spread fill, keep haul roads smooth and fast, cut ditches, slope banks, with 190-hp POWER-Flow® 660 grader.



To speed-up your off-road hauling on steep grades, and in tight places, use 27 or 32-ton LW HAULPAK® trucks.

YOU CAN DEPEND ON PRODUCTS BY



... WHERE QUALITY IS A HABIT

## The Future is bright for earthmovers!

Soon . . . the Interstate Highway program will again be in high gear . . . soil conservation and watershed programs are expanding . . . building construction is increasing . . . and more money for these major developments is being made available. In all of these areas of business activity the general index is "up", and the opportunity for earthmoving contractors looks good.

The opportunity for contractors owning LW earthmoving equipment is especially good. Production records prove, beyond doubt, that LW Tournapulls consistently deliver dirt at the lowest net-cost-per-yd. And the same is true of LW graders, trucks, and tractors. To convince yourself of this fact, talk to LW equipment owners. Ask them for comparative figures on production, downtime, maintenance. *Get the facts*, then talk to your LW Distributor about trade-ins.

Your LeTourneau-Westinghouse Distributor understands the problems and needs of earthmoving contractors, and the benefit of his broad experience is yours for the asking. His organization of factory-trained mechanics is available at all times to help keep your equipment operating at top efficiency, and he stocks factory-built parts to meet all emergencies. It's a good time *now* to evaluate your equipment and modernize with high-production LW machines. See your LeTourneau-Westinghouse Distributor *soon*.

**LETOURNEAU-WESTINGHOUSE COMPANY**

PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

# WHEN YOU RUN A **REICHDRILL** YOU'VE GOT A RIG THAT IS **ALL-HYDRAULIC** AND FEATURES **TOP-DRIVE**

*Drillers get "more hole per hour with a REICHdrill" because . . .*

REICHdrill Model T-650H, heavy truck-mounted drill for rotary or down-the-hole work. Hole size to 7½" in hard rock. Down pressure to 30,000 lbs.

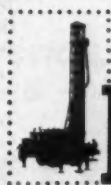
Choice of other hole sizes and down pressures available. Crawler-mounted rigs can be furnished in all models.

## **ALL-HYDRAULIC TOP-DRIVE MEANS:**

- 1. Infinitely variable speed** of drill rotation from zero rpm to maximum rated speed of model—permits the right rotational speed for every formation.
- 2. Safety torque release** which practically eliminates all chance of drill breakage . . . protects all drive components.
- 3. Direct-drive to drill stem** eliminating power loss . . . no complicated transmission to wear or maintain . . . no rotary table.
- 4. In and out of the hole faster** because no kelly bar is required.
- 5. Operator can drill up as well as down** should bit become stuck.

And the REICHdrill offers these outstanding advantages: Dependable heavy duty CP Compressors supply plenty of air to suit demand . . . Fast-acting, ram-type hydraulic levelling jacks . . . CP "Air-Blast" Bits give you extra footage in the toughest formations . . . Angle drilling—operator simply sets correct angle and drills.

*Write for full information on  
REICHdrills, today!*



# **REICHdrill**

Division: Chicago Pneumatic Tool Company  
1439 ASH STREET, TERRE HAUTE, INDIANA

DESIGNING  
WITH

# Steel Saved \$



*...and the superstructure went up in just six*



## HOW WELL CAN STEEL BRIDGES DO IN COMPETITION WITH OTHER MATERIALS?

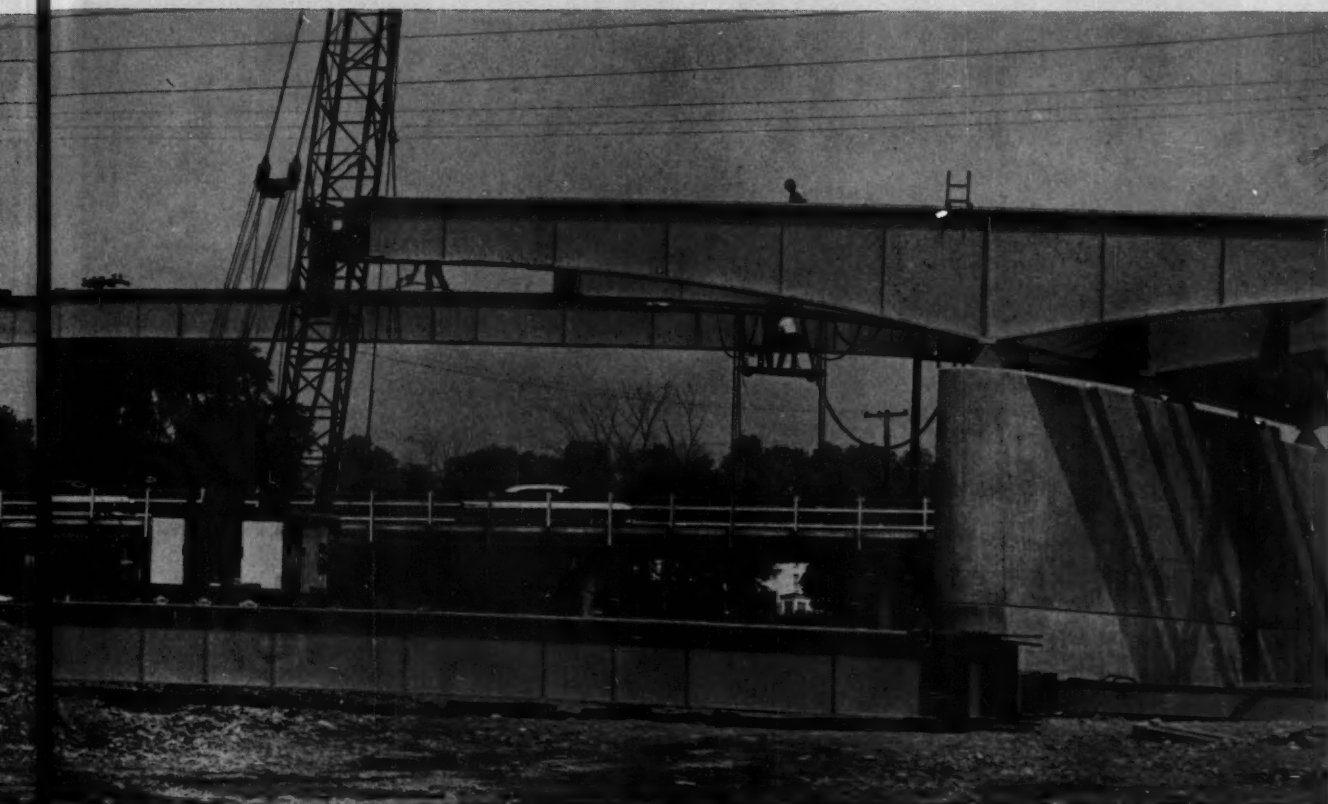
Just take a look at these facts and figures:

**NOVEMBER 21, 1958**—Pennsylvania Department of Highways accepted bids on a 350-ft-long, 4-lane dual highway bridge over Brodhead Creek between the boroughs of Stroudsburg and East Stroudsburg. The Department of Highways designed the bridge around the use of a competitive material, with an alternate for structural steel designs by the contractors, subject to approval by the Department of Highways. Contract awarded to J. Richard Nissley, Inc., whose low bid is based on a superstructure bid of \$300,000 for structural steel design by Bethlehem Steel. The only bid based on a design using competitive material was \$402,000 for the superstructure. Steel design saved \$102,000!

# \$102,000



*The first steel was placed on June 3.*



## *six working days!*

**APRIL 4, 1959**—Fabricating operations began at Bethlehem's Pottstown Works.

**JUNE 1, 1959**—First steel members shipped to the bridge site.

**JUNE 3, 1959**—Steel erection began.

**JUNE 10, 1959**—Closing members placed in 6 days!

**JUNE 12, 1959**—High-strength bolting operations completed. Bethlehem crew loaded out; general contractor took over.

**FOR LOW COST, FOR FAST CONSTRUCTION,  
ALWAYS SPECIFY STEEL BRIDGES**

# BETHLEHEM STEEL

*Closing the Brodhead Creek bridge on June 10. The center girders measure 67 ft long and weigh 15 tons each. The main span is 150 ft; the two side spans 120 ft each. The girders are of welded construction, connected in the field with high-strength structural bolts. Total tonnage: 630 tons.*



**B.F. Goodrich**



## Hose helps dig a ditch that will detour a river

### *B.F. Goodrich improvements in rubber brought extra savings*

**T**HOSE machines are drilling holes for dynamite charges to blast out rock. When the job is done, a mighty river will take a detour down this newly formed channel. Power for the machines comes from compressed air, carried by hose. But on jobs like this, rubber hose used to go to pieces in no time.

When heat from the compressor got into the hose, it would harden the rubber, breaking it into loose, gummy particles that clogged the machine,

put it out of action.

B.F. Goodrich engineers went to work on the problem. By adding, subtracting and changing proportions of rubber, they found a special compound for the hose that stands heat without scorching or hardening.

Hose lined with this new rubber was made and put to work. On jobs where air hose used to go to pieces in weeks, B.F. Goodrich hose now lasts months, even years.

Thousands of feet of B.F. Goodrich

air hose are in constant use on this job. It's been doing dozens of different jobs, and lasting longer doing them, even though it's dragged over rough, jagged rocks, soaked in water, sometimes battered by flying pieces of rock.

Your B.F. Goodrich distributor has the exact specifications for the B.F. Goodrich air hose described here. And, as a factory-trained specialist in rubber products he can answer your questions about all the rubber products B.F. Goodrich makes for industry. B.F. Goodrich Industrial Products Co., Dept. M-743, Akron 18, Ohio.

# **B.F. Goodrich** *industrial rubber products*

# Construction Methods AND EQUIPMENT

NOVEMBER, 1959

VOLUME 41 • NUMBER 11

HENRY T. PEREZ, Editor

## Costs, Prices, and Failures

THE FIGURES on contractor failures for the first nine months of the year (table) can be read with mixed emotions—at least by those still in business. Just released by Dun & Bradstreet, the statistics show an over-all decrease in the number of firms going bankrupt, but an increase in liabilities, compared to a similar period in 1958.

Nevertheless, the other-than-building contractors—and these include roadbuilders—bucked the trend. They managed to pare their liabilities 15% below last year's figure. On the other hand, the number who failed increased 36%.

This is a dismal record. And the record probably would be even more dismal if the figures included

those firms temporarily kept afloat by friendly sureties and bankers.

There are many reasons, of course, why contractors go broke. Some failures are due to a personal tragedy. A few, perhaps, to an "act of God." But far and away the greatest number are caused by plain incompetence.

This incompetence is not necessarily in the technical line. Rather, it more often is a lack of knowledge of just what it costs to do business today. Without knowing your costs, you can't bid intelligently. And without intelligent bidding, the list of contractor failures is sure to grow

There are many variables, of course, in trying to predetermine what your costs will be on a job you're bidding. And here is where estimating skill comes in. But in too many instances the fine product of the estimator's art runs into the dead end of hunger for work.

Wishes replace reason. "Sure, it'll probably cost us all of that to do the job. But right now we're not too busy. We really could use the work. Besides, I hear Joe's going to bid it, and he's rough to beat. Let's trim a bit off our figures here and there. Maybe we'll be lucky. If we get all the breaks, we may come out ahead. Anyway, we'll be keeping busy." Well, this is foolish reasoning that can only lead to ruin.

Remember, there's a difference between costs and prices. And cutting costs is all to the good. Such things as more efficient scheduling of men and equipment, greater job safety, better equipment maintenance, pioneering new techniques can all help cut costs and increase profits.

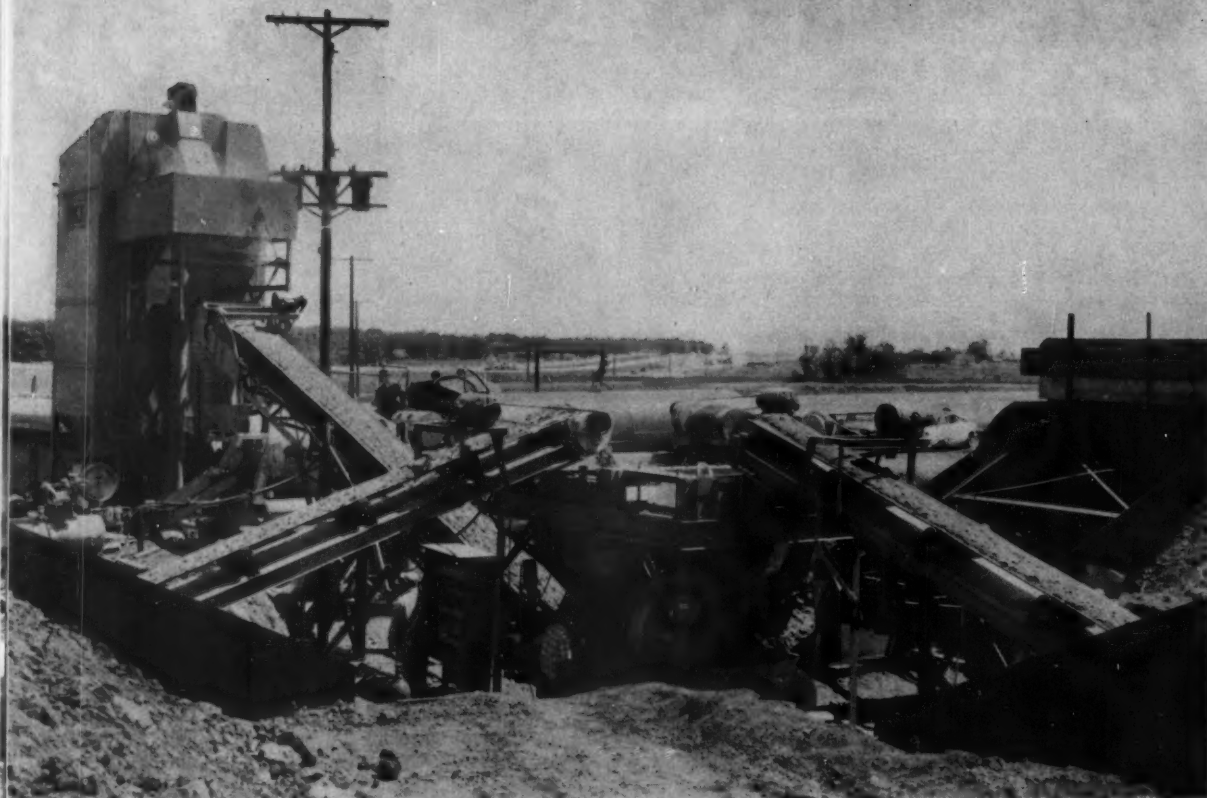
Cutting prices, on the other hand, is no answer at all. The contractor who cuts prices to the level of his own costs, or below, does so at his peril. Unfortunately, he also imperils those efficient competitors who know their costs, bid accordingly, and try, rightly, to earn a modest profit.

### Contractor Failures—First Nine Months, 1959

Reported by Dun & Bradstreet, Inc.

	Number		%	Liabilities ('000)		%
	1959	1958	Chg.	1959	1958	Chg.
U.S. Total .....	1,551	1,634	-5	\$92,162	\$88,803	+4
<b>BY TYPE OF CONTRACTOR</b>						
General building contractors .....	540	654	-17	51,130	47,207	+8
Building sub-contractors .....	889	890	-0.1	32,272	31,256	+3
Other contractors .....	122	90	+36	8,760	10,340	-15
<b>BY SIZE OF LIABILITY</b>						
Under \$25,000 .....	800	851	-6	8,979	9,338	-4
\$25,000-\$99,999 .....	559	580	-4	26,350	27,945	-6
\$100,000 & over .....	192	203	-5	56,833	51,520	+10
<b>BY REGION*</b>						
New England .....	104	112	-7	5,975	5,527	+8
Middle Atlantic .....	341	412	-17	20,143	22,451	-10
South .....	220	250	-12	16,378	13,216	+24
Middle West .....	347	326	+6	19,764	22,542	-12
Miss. R. to Rockies .....	169	172	-2	10,869	6,673	+63
Far West .....	370	362	+2	19,033	18,394	+4

\* regions approximated by combining Federal Reserve Districts of original data.



## BINLESS BATCH PLANT

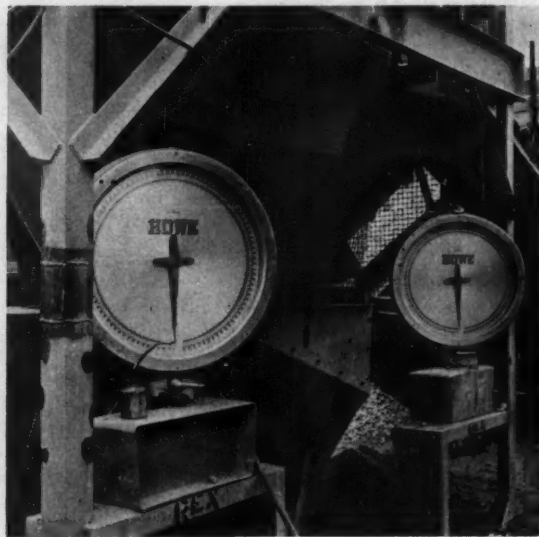
Three conveyors feed aggregate directly from truck unloading hoppers to three batchers. Elimination of overhead aggregate storage bins cuts handling costs.

# New Equipment Boosts

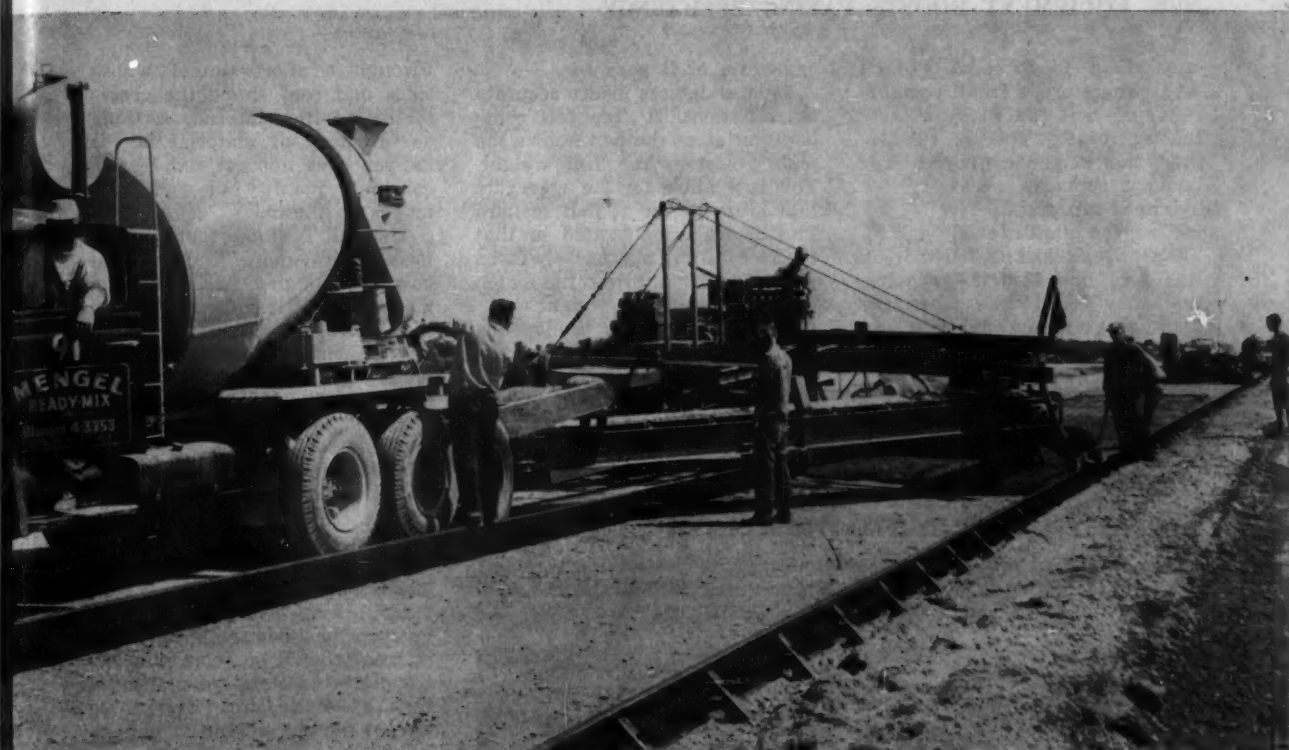
*A batch plant with no overhead bins and a contractor-built concrete spreader improve paving efficiency on an interstate highway job.*



**UNLOADING HOPPER**—Aggregate trucks dump their loads into portable hopper that funnels material directly onto conveyor belt.



**BATCHERS**—Dial scales on each of the three aggregate batchers provide fast and automatic weighing of the 2-cu-yd batches.



## CONVEYOR-BELT SPREADER

Contractor built this spreader on an old tandem truck chassis. Hooked to back of transit-mix truck, rig spreads concrete with swinging conveyor.

# Paving Efficiency

FOR A LONG TIME highway paving methods and machines have shown very little change. But currently there are signs that major new developments may be on the way. Typical of the experimenting that is going on is a road job in Wisconsin where the contractor has successfully tried several new ideas.

The contractor is the F. F. Mengel Co. of Wisconsin Rapids. They are just finishing a pair of contracts totaling \$1.8 million for a 10.5 mi stretch of four-lane highway on Interstate Route 94 (old U. S. 41). The new highway runs from Milwaukee to Chicago; Mengel's contract is in Wisconsin, just north of the Illinois state line.

Mengel likes to pave with transit-mixed concrete. On this job they have come up with a couple of unusual techniques to improve their transit-mix operations.

● They are the first outfit to set up the latest version of Chain Belt Company's "binless" batch

plant. This plant has no overhead aggregate bins; aggregate goes into the batchers right off a conveyor belt.

● To spread the concrete in the forms, Mengel developed and built a unique self-propelled conveyor belt spreader that they claim is faster than commercial machines now on the market.

### Binless Batch Plant

The unusual feature of the binless plant is the way the aggregate is handled up to the time it enters the batchers. Chain Belt Co. designers, who look on batch plant design basically as a problem in materials handling, eliminated one complete step in the normal handling sequence. They feed the aggregate directly into the batchers off a conveyor without passing it through overhead bins.

Mengel has eliminated still another step in the handling process. They do not maintain large aggregate stockpiles; the delivery trucks dump their loads right on-

to the conveyor leading to the batchers.

This requires good truck scheduling. Mengel has been able to maintain a steady flow of aggregate to the plant even though it is hauled 25 mi to the job site.

As a safety precaution, they do keep a small pile of aggregate handy. The pile rarely exceeds 500 cu yd, but it is enough to keep the plant operating if supply trucks are late. A 3-yd Michigan 174A front end loader charges the conveyor from the stockpile when necessary.

The trucks dump their loads into one of three 11x12-ft, 37-yd aggregate hoppers. One hopper handles sand; the other two handle two sizes of aggregate. These hoppers are mounted on wheels and set at ground level. A built-up gravel ramp at each hopper allows the trucks to dump directly into them.

Each hopper feeds aggregate onto a 24-in. portable conveyor that elevates the material to the top of the batchers. There are three batchers, one for each of the three materials.

One of the advantages of the binless plant is apparent at this point. The top of the batchers is

only about 15 ft above ground level. Therefore, a small portable conveyor belt can easily elevate the aggregate. This is cheaper than the longer conveyors and heavier supports necessary for overhead bin plants.

Also, the plant is easily moved. They haven't had to move it on this job, but Mengel estimates that they could take down the plant, move it to a new site, and have it working within three days.

The three batchers each have a capacity of 2 cu yd. Dial scales automatically weigh the sand and

aggregate as it goes in.

Several devices insure accurate measurement. A free fall compensator stops the belt before the scale registers the full weight. This is to allow for the aggregate that is in the air at that instant. The device is calibrated so that the free-falling aggregate will be just enough to bring the batch up to the required weight.

For this device to be dependable, the flow of material must be constant. This is achieved by shaping the aggregate on the belt. As the aggregate flows from the hopper onto the belt, it passes

through a short tunnel whose sides and roof shape the cross-section of the material. As long as the head of material in the hopper does not get too low, a constant quantity of aggregate moves up the belt.

The belt is stopped by electric braking—reversing the flow of current through a special winding into the electric motor that runs the conveyor. Tests by Chain Belt indicate that this method of weighing aggregate is unusually accurate. In speed of operation it is comparable to gravity feed methods.

The batchers work in sequence, and each feeds its weighed batch onto a common 30-in. conveyor that elevates it to the truck charging hopper. The timing is so close that there is an almost continuous flow of weighed aggregate up the 30-in. belt.

From the 30-in. conveyor on, the plant is a standard Rex model 125 Porto-Plant. Everything except the cement bin is on rubber-tired wheels for portability. A fifth wheel on most units provides for easy positioning.

The cement bin that comes with the plant has a capacity of 485 bbl and is filled by means of a screw loader. Mengel found that the unloading speed was too slow and the storage capacity was too small for the rate of concrete production they wanted. So they added a second 600-bbl cement silo with a fast-operating, blower-type unloader.

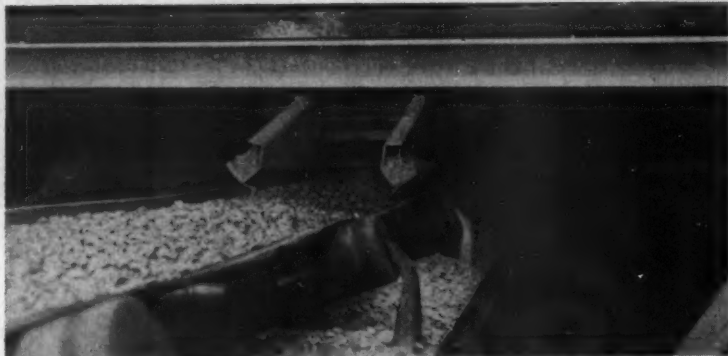
Water for the plant comes from two wells that Mengel dug on the site. It is stored in three tanks with a total capacity of 23,000 gal. The plant consumes about 1,500 gal of water a day. Water is metered automatically into the charging hopper with each batch.

To keep the charging end of the plant as low as the batching end, Mengel dug the roadway for the trucks several feet below ground level. To speed loading, they cut the grade so that, when a truck is in position to be loaded, it is on an incline with the front end about 1 ft lower than the back.

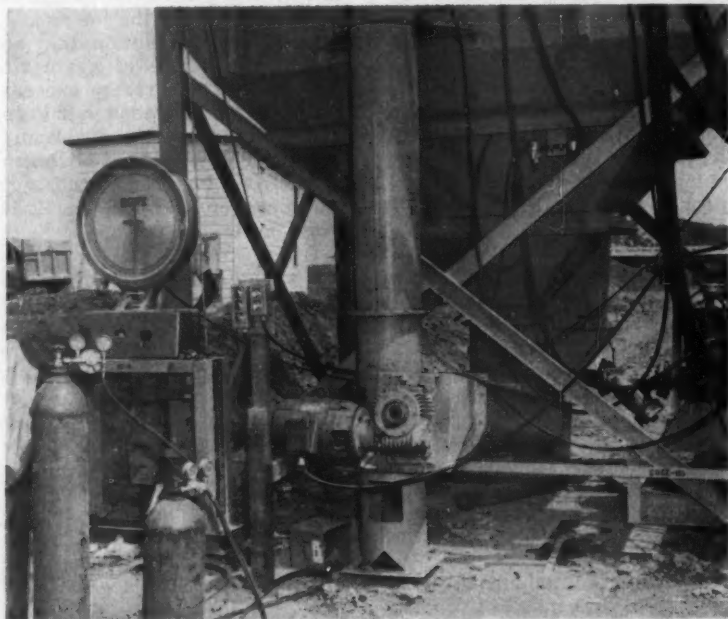
Average loading time for a truck is 1½ min. Trucks are International V-8's carrying Rex 6-yd front engine power take-off mixers. Mengel has 10 in the fleet. Longest haul distance is 6 mi to the north end of the job.

Power for the plant comes from

## Plant Has Accurate Measuring Devices



**MEASURING AGGREGATE**—Guides at hopper gate form constant cross-section of material going onto belt. This makes constant the rate at which aggregate enters batcher.



**MEASURING CEMENT**—Dial scale automatically weighs cement going into trucks. Electrically powered screw loader transfers cement from storage bin to loading hopper.

several sources. The conveyors are powered by electric motors, fed by purchased electricity. Hopper gates are powered by compressed air supplied by an Ingersoll-Rand compressor.

Average production is 150 cu yd per hr for a 10-hr day; top production was 200 cu yd in 1 hr. The capacity of the batchers is greater than that, but the plant output is limited by the truck loading time.

Three men normally work at the plant. One man operates the entire plant by himself. The second man operates the front end loader. The third man is the truck foreman.

### Concrete Spreader

Mengel mechanics designed and built the spreader in their own shops. The chassis is an old tandem-axle truck frame. It is self-propelled, powered by a Chrysler engine with torque converter transmission.

The rig travels outside the lane being paved. At one end is a hook that connects to the transit mix trucks. The operator of the spreader controls the hook by remote control, releasing it with a hydraulic ram when the truck is empty. The spreader pushes the truck along with it while it is unloading.

The truck dumps its concrete onto a 30-in. electrically powered rubber conveyor belt 25 ft long. One end of the conveyor is connected to the spreader frame with a hinge so it can swing radially back and forth and deposit the concrete evenly across the lane.

The swinging end of the conveyor rides under a T-section boom connected to the frame of the spreader. The boom is curved to the circumferential path of the end of the conveyor.

Attached to the boom by cables is a job-built strike-off bar that straddles the lane and rides the side forms. It crosses the lane obliquely, approximately parallel to the boom of the spreader.

One operator controls the entire spreader operation from his seat. Hydraulic cylinders swing the conveyor and adjust the depth of the strike-off. The rig has power steering.

Mengel is paving two 12-ft lanes on each side of the divided highway. The spreader couldn't handle the full 24-ft width. But

for the narrow lane it is very effective.

The pavement is reinforced concrete so the spreader has to make two passes. First, it lays the bottom part of the slab. Then a crew puts down the reinforcing mesh. With the strike-off adjusted to the full depth of the slab, the spreader makes its second pass. For this sort of operation, the mobility of the rig is a real asset.

Mengel is averaging 4,000 lin ft of 10-in. pavement, or 1,500 cu yd of concrete, per 10-hr day. On their best day they put down just under a mile of pavement.

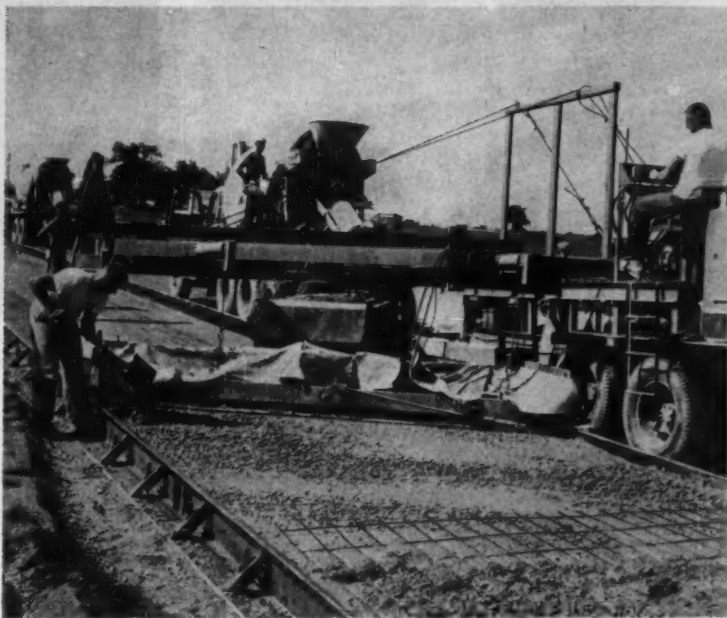
The paving train consists of the spreader, a Blaw-Knox finisher, a Rex finisher and pan float, a Koehring bullfloat, and a Cutler curing machine. A Cat No. 12 grader helps shape the subgrade.

The contract was let in November, 1958. Mengel started paving last June. They expect to finish the job this fall.

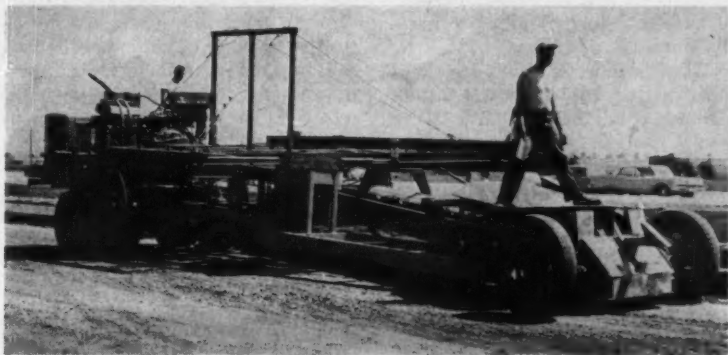
### Men on the Job

Bill Mengel is superintendent. For the State Highway Commission, Douglas Small is resident engineer, and R. E. Pentico is materials engineer.

## One Man Operates Concrete Spreader

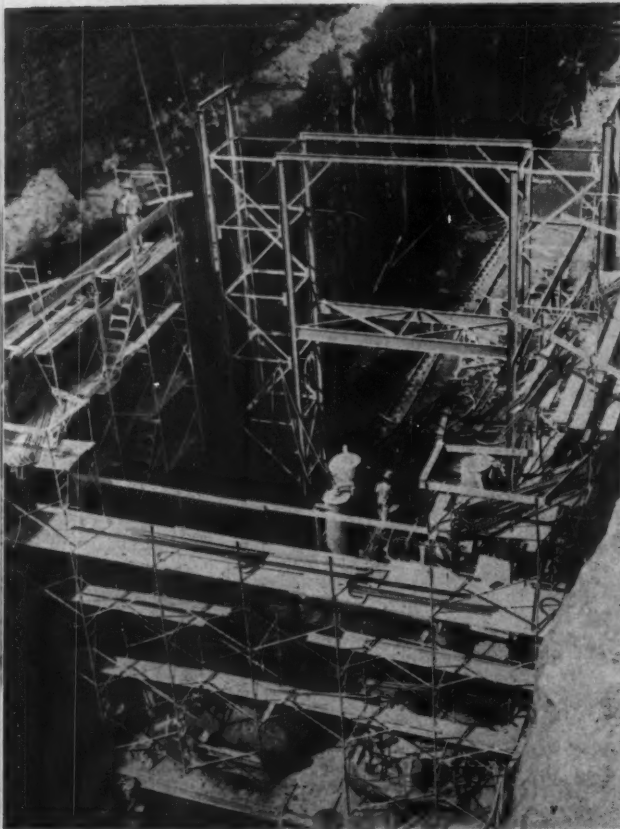


**LAYING CONCRETE**—Conveyor, swinging on horizontal boom from frame of rig, spreads concrete across lane. Boom drags strike-off that levels first layer of concrete.

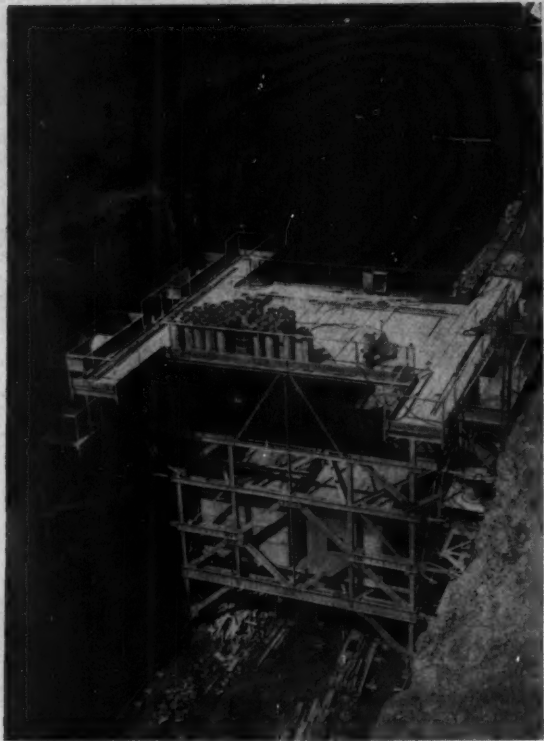


**SECOND PASS**—After reinforcing mesh has been placed, operator moves rig into position to spread top half of slab. Mobility of old truck chassis is an asset here.

# Train of Jumbos



**FIRST JUMBO**—Moving ahead of form-carrying jumbos, this frame carries rock drills and work platforms for reinforcing crews.



**SECOND JUMBO**—Built by Blaw-Knox especially for the Niagara project, jumbo carries forms for bottom halves of the side walls.

*To pour the 44x69-ft concrete conduits that will carry water to the Niagara Generating Plant, the contractors mounted a series of special forms on traveling jumbos.*

**THEY DO EVERYTHING** in a big way on the Niagara Power Project at Niagara Falls, N. Y. Right now the highlight of the work is the concreting of the huge conduits that will carry water to the generating plant. The contractors have set up several unusual trains of traveling form jumbos to handle the difficult pours.

Twin concrete conduits will carry water 4 mi from the intake structure in the Niagara River above the falls to the generating plant reservoir below the falls at Lewiston, N. Y. Each conduit is 44 ft wide and 69 ft high with an arched concrete roof. They are being built in open cuts that later will be backfilled around the conduits.

The job of building the conduits is divided into three sections. Merritt-Chapman & Scott Corp. has a \$65-million contract for the

intake structure and the first 8,000 ft of conduit. A joint venture of Edward Balf Co., Savin Brothers, and D. W. Winkleman Co. has a \$37-million contract for the middle 9,000 ft. A joint venture of Gull Contracting Co. and L. G. De Felice & Sons has a \$30-million contract for the final 5,500 ft to the forebay of the powerhouse.

The Balf combine was the first of the three groups to start concreting. They have been at it for several months; now they have it down to a smooth system. The others are just starting. Their methods and equipment will be almost identical to Balf's so you can get a pretty good idea of what is going on by looking at the Balf job.

Balf is working in two directions in each conduit. This makes four separate headings, and they have a complete set of traveling

forms for each one. At present they are not up to full production, having just started in some the headings, but they shortly will be working full speed in all of them.

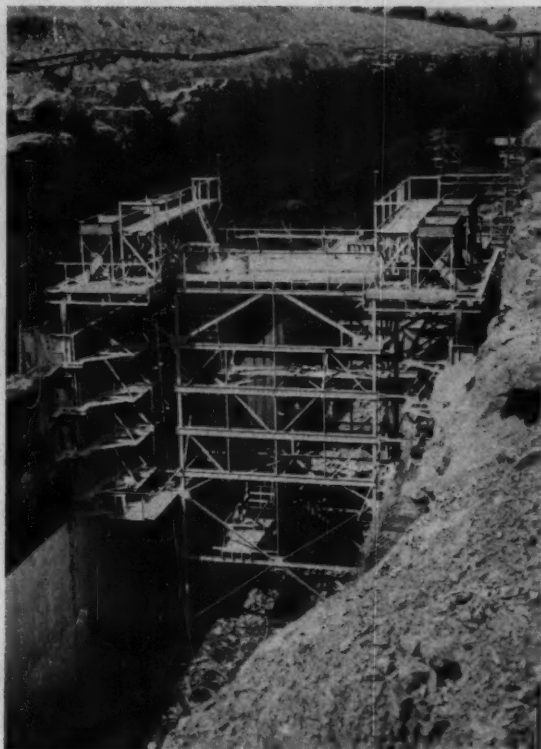
## Pouring Sequence

There are five steps in the pouring sequence, and each has its own forms. The five stages go on more or less simultaneously as the whole lineup of forms moves along the trench excavation.

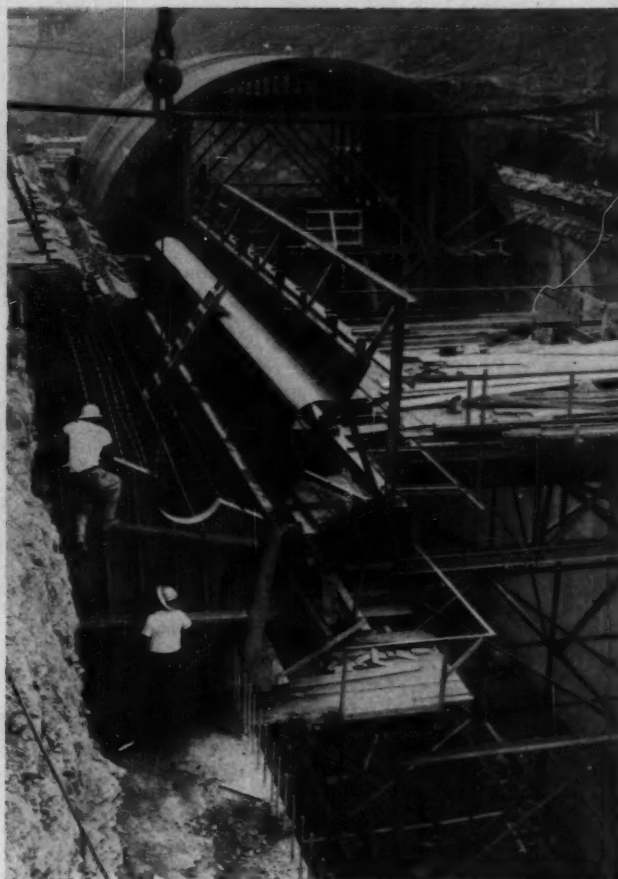
First step is to pour the floor. This is handled in 40-ft lengths, as are all the pouring operations. The 40-ft-long slabs are divided into four separate pours. Two center sections each are 22 ft wide; the two edge sections are 2 ft 9 in. wide.

Before the center sections are poured, crews lay two lines of half-round 24-in. concrete drain-

# Handles Niagara Conduit Forms



**THIRD JUMBO**—Next in the train is the jumbo that carries the forms for the top halves of the 43-ft-high side walls.



**FOURTH JUMBO**—Next form handles complex shape of the haunch, a transition section between the wall and arch.

age pipe running longitudinally with the conduit. Every 40 ft they link up these pipes with half-round 12-in. lateral pipe. These pipe will drain excess ground water from around the outside of the completed conduits after the trench has been backfilled.

Reinforcing steel in the floor runs both ways on 12-in. centers. It takes 52 tons of reinforcing steel for each 40-ft length of floor. G & H Steel Service, Inc., of Philadelphia has the subcontract for reinforcing. They ordered 35,000 tons of reinforcing bars from Bethlehem Steel Co. This is one of the largest single reinforcing orders that Bethlehem has ever handled.

The floor slab does not extend the full width of the trench. It stops 9 to 12 in. short of the rock walls on each side. This was called for in the specifications so



**FIFTH JUMBO**—Bottom of arch is formed by hinged arch form. Because of steep slope of the arch, second form is needed for top surface. Arch fits into haunch keyway.

## Pouring the Arch Roof Requires

that any inward movement of the rock will not buckle the floor.

After the floor has been poured, crews carefully cover the gap between the rock walls and the edge of the floor slab with sloping 2x8-in. boards. One end of the boards rests against a ledge formed in the floor slab; the other leans against the rock and is cut to fit the contour of the rock. These boards prevent concrete from filling the gap when the side walls are poured.

When the floor is complete, crews lay the rails that carry the form jumbos for the remaining operations.

### Jumbo Parade

The first jumbo in the line is a combination rig that mounts two rock drills plus working platforms for the reinforcing crews. There is one Joy 450 air-powered drill on each side of the jumbo. Both are mounted so that they can move up and down to cover the whole wall.

The drills make 3-in. dia holes, 8 ft into the rock to hold hooked steel reinforcing anchor bars. The holes are located every 6 ft in the vertical direction and every 8 ft along the trench. They extend downward into the rock at a 30-deg angle.

On the same jumbo is a tower of Patent Scaffolding 46 ft high that extends to the top of the side walls. Men working on this tower place the reinforcing steel bars in the holes and grout them in. They also clean the face of the rock wall prior to pouring the concrete side walls.

The second jumbo in the line carries the forms for the bottom half of the 3-ft-thick side wall. It is 21½ ft high and 40 ft long. This form and all the other major formwork was designed and built by the Blaw-Knox Co. to meet Balf's requirements for the job. Blaw-Knox also made the forms that the other two contractors will use on their sections of the conduit.

Before the wall is poured, 1/16-in. lead sheeting is placed on top of the floor slab under the wall. This, like the gap at the edge of the floor, is to allow for inward movement of the rock. Any movement could shift the walls slight-



**LOWER FORM**—Reinforcing crews tie bars in place on top of lower arch form. Lower form is supported on jumbo that rides rails on floor of conduit. Hinges at quarter points of

ly without breaking the joint at the floor.

The third jumbo is similar to the second except that the forms are set to pour the top 21½ ft of the wall.

Every 40 ft along the wall, at the construction joints, a 9-in. wide rubber seal is inserted during the pour to make the joint watertight.

The specifications require that an 8-in. vertical drain up the side of the rock be provided every 10 ft along the wall. This involves a tricky bit of forming. Merritt-Chapman & Scott discovered a neat way of handling it, and the

other contractors, including Balf, have adopted the scheme.

They form the drain with an inflated rubber tube, manufactured by an English company. This flexible tube conforms to the contours of the rock face. To protect it during the pour, and to keep concrete from getting between it and the rock, they surround it with an arch of wire mesh. After the wall is poured, the tube is deflated and withdrawn, leaving a clear vertical drain against the wall.

The fourth jumbo carries the haunch forms for each side. The haunches are smaller sections at

## the Upper, Three Lower Forms

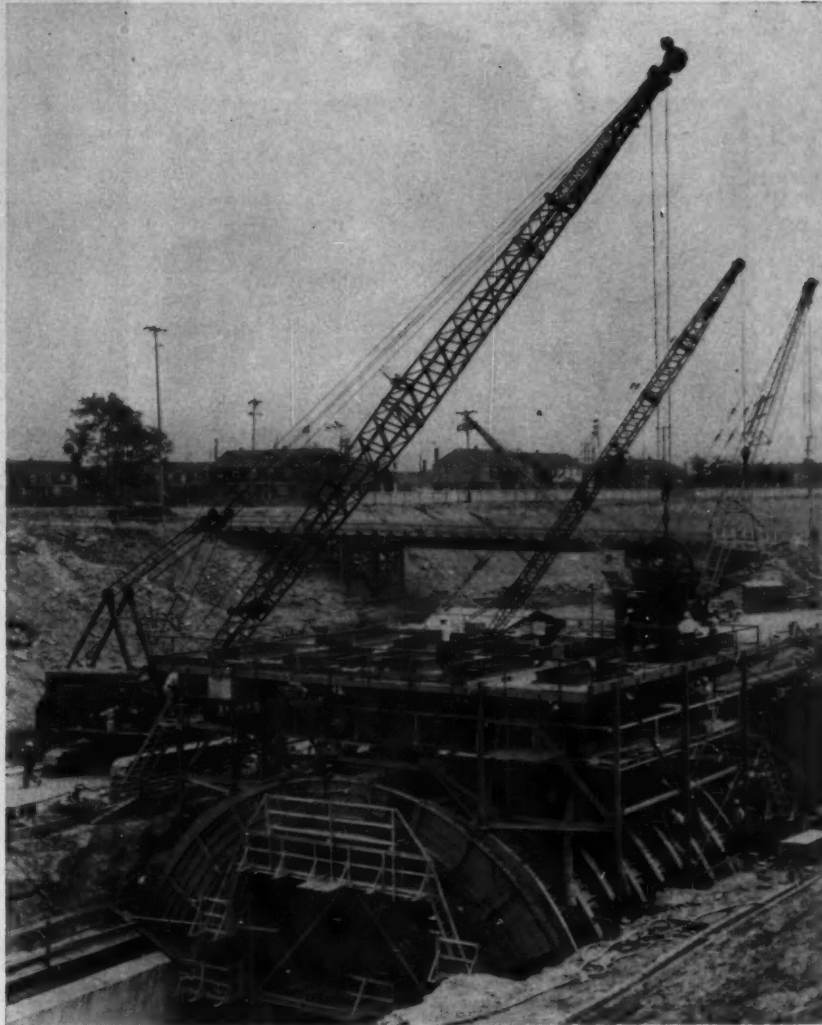


form allow sides to fold down and release form after the concrete has set.

the top of the walls that provide a transition between the vertical walls and the arched roof. Along the top of the haunch section is a semi-circular keyway to provide an effective joint with the arch pour. The key is formed by a specially shaped lid on the haunch form that swings into place on hinges.

Forming the arches is the most complicated operation. Two separate forms are needed; one form is for the underside, the other goes on top.

Specifications require that the lower arch form be left in place for 72 hr; the top form can be re-



**UPPER FORM**—Crane and bucket pour concrete into hoppers of upper form. Three lower forms work with one upper form because the lower stays in place three times as long.

moved after 24 hr. So it takes three lower forms to keep pace with one upper form.

The arch is 7 ft thick at the haunch, 5 ft thick at the top. It is curved on a 26-ft radius. For each 40 ft of conduit, about 500 cu yd of concrete goes into the arch and 200 cu yd goes into the walls and haunch.

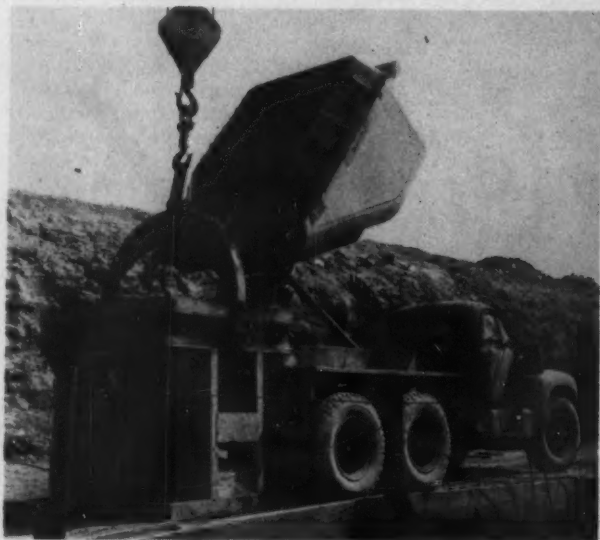
### Concrete Handling

Balf's section of the job will require 600,000 cu yd of concrete. At present they are pouring 30,000 cu yd a month, but they expect to hit 50,000 cu yd a month when all the forms are working.

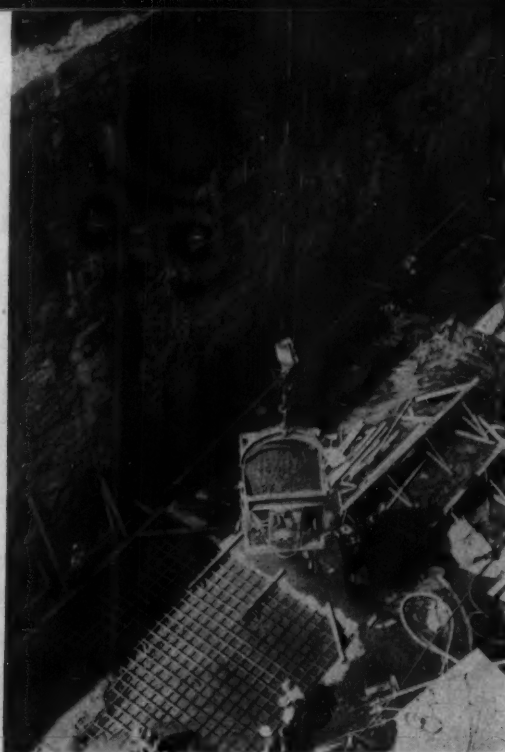
Balf set up their own 200-yd-per-hr central mix concrete plant. A refrigeration plant supplied chilled water and ice to keep the concrete below 60 deg on the arch pours and 70 deg elsewhere during summer pouring operations.

A fleet of ten 7-yd Dumpcrete trucks hauls the concrete from plant to site. It's about a 5-min haul. The trucks move along as fast as possible because the concrete is designed for a slump of 3 in. at the plant, and, unless they get it to the pouring area in a hurry, it becomes too stiff to handle properly. Even with the short 5-min run, the concrete becomes

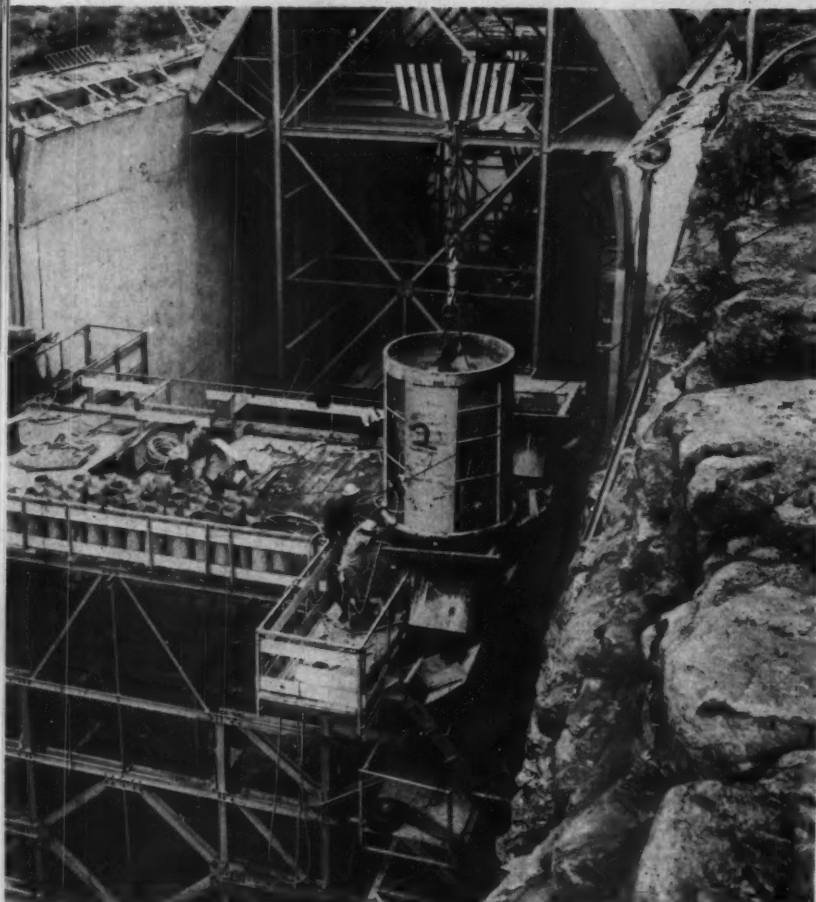
## TRAIN OF JUMBOS ... continued



**DELIVERING CONCRETE**—Seven-yard Dumpcrete truck dumps concrete into bucket. Trucks haul concrete from a 200-yd-per-hr plant.



**POURING THE FLOOR**—Crane lowers 4-yd bucket directly to floor of conduit. Half the width is handled in one pour.



**POURING THE WALLS**—Bucket dumps concrete into hoppers on wall form. Hoppers funnel it into smaller hoppers from which it can be placed accurately in small quantities.

stiff enough to require extra vibrators at the forms.

At the pouring site the trucks dump concrete into a 4-yd Blaw-Knox bucket that is handled by one of several crawler cranes on the job. The crane lowers the bucket directly to the forms during the floor slab pour.

For the side wall forms the handling is different. On each jumbo are four Gar Bro 4-yd double hoppers. These hoppers feed the concrete into chutes that lead in turn to smaller hoppers. The smaller hoppers funnel the concrete through elephant trunks into the forms.

This system allows the crane to feed the concrete quickly into the large hoppers. At the same time it allows the crew to place the concrete in small quantities exactly where they want it to go.

Balf has about 750 men on the job. During the summer months they worked two 8-hr shifts. Concreting operations started last June, should be finished by next fall.

### Men on the Job

For the joint venture, D. E. Stinson is project manager, J. R. Blinn is project engineer, and J. A. Whitelaw is office engineer. Harold Boles is resident engineer on Section II for the New York Power Authority.

## HOW TO HANDLE WET JOBS

#51 of a series

**Project:** Chrystie St. subway tunnel, New York City

**General Contractor:** Cayuga Foundation Corp., New York City

**Pumping Contractor:** Wellpoint Dewatering Corp., New York City



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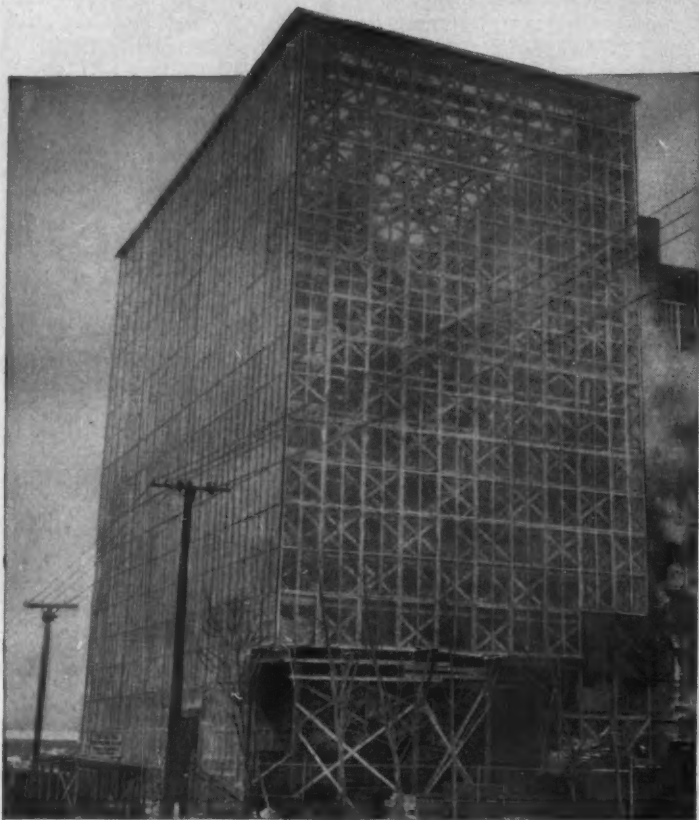
**BRANCHES:** HAMMOND, IND. • HOUSTON, TEX. • NEW YORK, N. Y. • JACKSONVILLE, FLA. • WEST PALM BEACH, FLA.

**In Canada:** Construction Equipment Co., Ltd., Toronto • Montreal • Edmonton • Vancouver  
**In Venezuela:** Drew Bear & Sons C.A., Caracas • Maracaibo

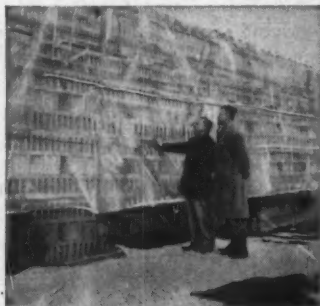


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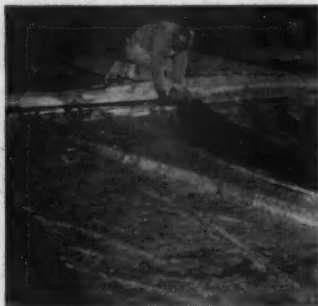
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When planning your next building start, check with your supplier of Du Pont Polyethylene Film. Ask for Du Pont's new "Specification Booklet" with suggestions that will help you cut costs . . . maintain work schedules . . . protect valuable equipment and materials. If your supplier is temporarily out of stock, write Room CM-11, E. I. du Pont de Nemours & Co. (Inc.), Film Dept., Wilmington 98, Delaware.

\*"Mylar" is a registered trademark for Du Pont's brand of polyester film.



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# Wisconsin Roadbuilder Job-Tests New Tribatch Paver



**FIRST JOB**—In Milwaukee, visiting contractors crowd around Druml Co. paving train to watch the Tribatch paver in action. This is its first appearance on an actual job.

*Koehring's Tribatch paver is a significant development in paving machinery. Its three 34-cu ft drums produce 40% more concrete than dual-drum pavers.*

THE FIRST really new concrete paver to reach the market in 20 years is making its debut, with appropriate fanfare, on a street paving job in Milwaukee. The rig is called the "34E Tribatch Paver."

It was developed by the Koehring Co., and they call it the world's largest paver. It's rated capacity is 43% greater than any paver in general use today.

The Druml Co. of Milwaukee is the first contractor to job-test the new machine. They have a \$500,000 contract to pave 1.7 mi of Forest Home St. in southwest Milwaukee.

The job is too short, and the roadway is too sprinkled with manholes to allow the Tribatch to run at full speed for any length

of time. But when it does get a clear run, it lays down concrete at an impressive rate.

### **Contractors Look It Over**

Since the latter part of September, when Druml started paving with the Tribatch, contractors from all over the country have visited the job to get a look at the new rig in action. A number of them have since ordered one for themselves.

For years, paving contractors have been asking manufacturers for something that would increase paving production. There are two ways to do this. One is to increase the size of the drum; the other is to increase the number of drums.

Koehring decided on the latter

approach—putting in three drums instead of two and keeping the size of each drum the same. There are two principal reasons for this choice.

First, keeping the drum size the same means that existing batch plants and trucks can supply the paver just as easily as they do dual-drum pavers. In fact, the same equipment can handle both Tribatch and regular pavers on the same job.

Second, increasing the size of the drums would require extra mixing time under some state highway department specifications. Some day there may be agreement on size of drum vs. mixing time. But right now it is a risky business for a manufacturer to increase drum size on a



**CHARGING THE PAVER**—Skip has just deposited a batch in the first drum of the paver. Completed batch comes out the other

end every 29 seconds. Batch trucks have to hustle to keep up with this cycle, but so far they have had no trouble doing it.

### TRIBATCH PAVER... continued

paver that he hopes will be used in every state.

The three compartments reduce cycle time for a 37½-yd batch from 42 sec (Twinbatch time) to 29 sec, based on a 60-sec mixing time. This works out to 124 batches or 172 cu yd per hr. Corresponding hourly production figures for the Twinbatch paver are 86 batches and 120 cu yd.

With the paver moving 40% faster, one question that comes to mind is, can the trucks and the rest of the paving train keep up with it? Karl Lotharius, Druml superintendent, says that he has no problem with the trucks, but on a wet day the finishing machines sometimes have trouble keeping up.

Druml has six batch trucks hauling about 1 mi from the batch plant. Each truck carries three batches. There are about 50 men on the job, working a 10-hr day. Paving a 24-ft lane of reinforced concrete pavement, they average 900 lin ft a day. This relatively

low production is governed by the numerous manholes.

### Paver Specifications

The Tribatch weighs 70,000 lb. It is 12 ft 9 in. high and 10 ft 3 in. wide with platform. Boom length is 37 ft 6 in., allowing it to reach comfortably across a 30-ft lane.

To handle the increased depth of slab being specified on many airfield jobs today, the clearance between the bottom doors of the bucket and the subbase is 30 in. The boom can be elevated 30 deg to provide a clearance of 15 ft under the bucket doors. The bucket has double doors and a capacity of 55 cu yd.

Koehring claims that the Tribatch is easier to operate than dual-drum pavers because of its Batchmeter. This is an electric automatic control of all mixing cycle functions. Safety devices prevent one function from starting until the previous one has finished.

A new pressure water injection system increases the speed of

adding water and maintains satisfactory precision of measurement. Water storage capacity on the paver is 1,200 gal.

The paver can move forward or backward at a speed of 1 mph.

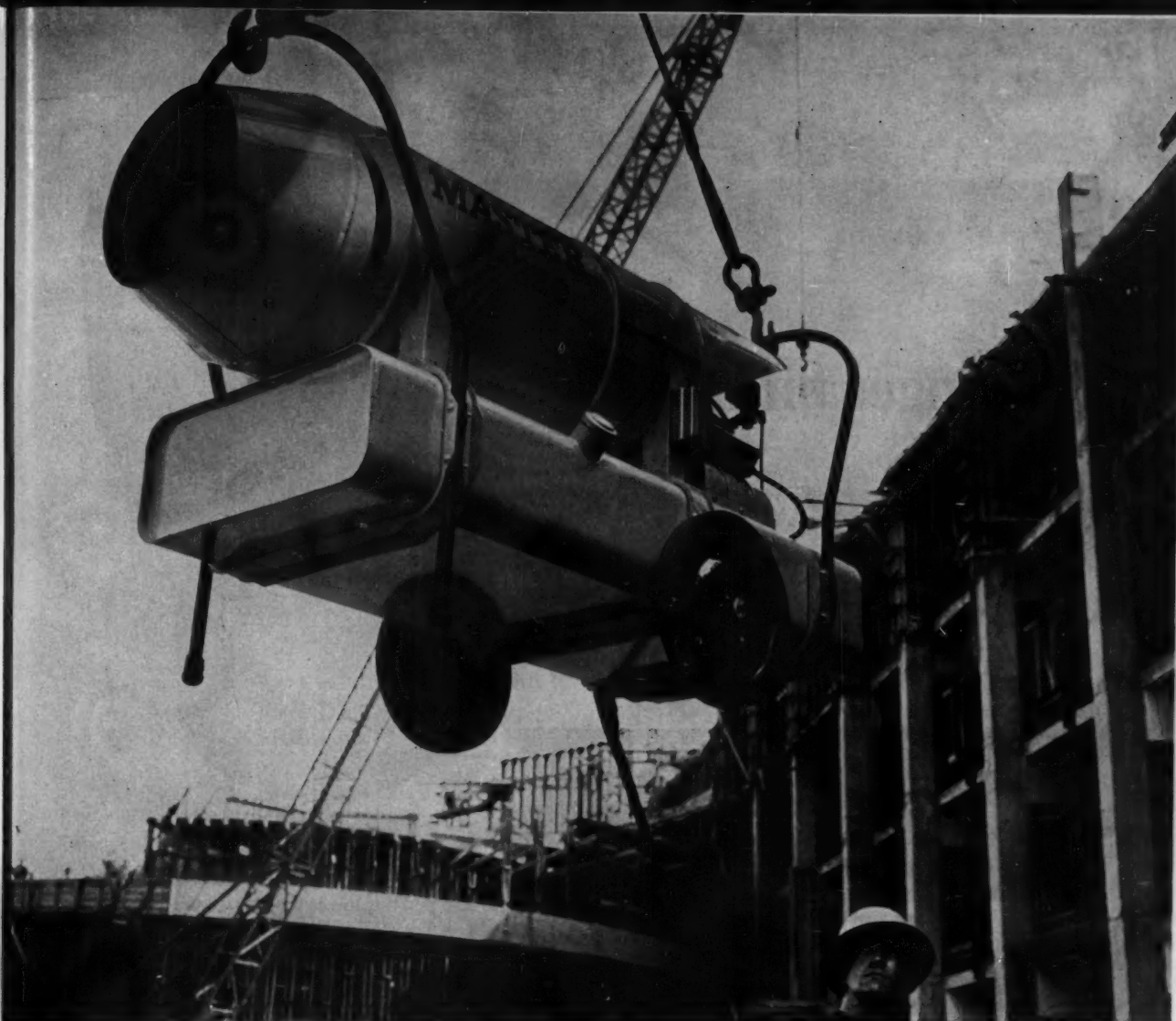
### Batch Plant

Druml has set up a Johnson Automaster batch plant. It has a 2-cu-yd batcher, 120-cu-yd aggregate bin capacity, a 120-cu-yd cement bin and a 757-bbl cement silo. A Koehring 545 Sprawler crane with a 1½-yd clamshell bucket charges the bins from aggregate stockpiles.

The plant is a standard setup except for one interesting device that Druml developed to control dust when they are loading cement into the batch trucks.

The final section of pipe that funnels the cement into the truck must be flexible so that the trucks can get under it without damaging it. But a flexible pipe is hard to handle, and a method of placing it into the truck compartment is needed.

*continued on page 91*



## *New heater gives more heat, better service*

This new Master B-320 circulating warm air heater gives you *more heat per dollar than any other portable heater we've found on the market*. You get as much heat as other heaters give you costing 20% more.

Compare it with all the rest and see for yourself.

And, while you're looking, note Master's exclusive fan cut-off switch that automatically cuts off the fan after the thermostat cuts off the burner... saving wear on the motor and pump and keeping the unit from blowing cool air. Examine the rugged construction, superior thermostat, more powerful motor... even the quality paint job.

You'll see why Master is first in sales. *You just plain get more for your money.*

### Comparison of Master B-320 with competitive heaters:

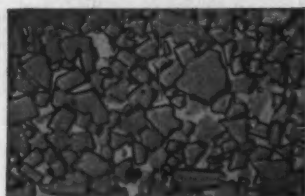
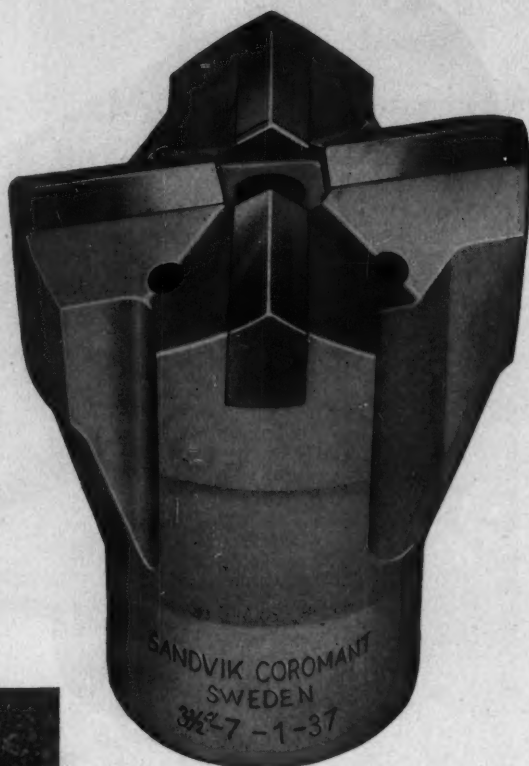
	BTUs	Motor hp	Automatic Fan Switch	Aver. Del'd. Price
<b>Master</b>	<b>320,000</b>	<b>1½</b>	<b>Yes</b>	<b>\$400</b>
Brand A	300,000	1½	No	405
Brand B	320,000	1½	No	485
Brand C	300,000	1½	No	410

Master heaters will warm workers, thaw or dry materials, pre-heat engines, spot-heat out-of-doors or warm many rooms inside. They'll help keep your job on time and raise winter profits. Available in three sizes—125,000; 320,000 and 400,000 BTUs per hour.

Your Master distributor has heaters for sale or rent. Call him for a free trial, or write Master Vibrator Company, Dayton 1, Ohio.

# MASTER

# Longer bit life— with *new* Sandvik Coromant Bits



**Sandvik Coromant Tungsten Carbide**  
(Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities—therefore stronger, longer-lived.



**Low quality Tungsten Carbide**  
(Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.

## Sandvik Coromant Detachable Bits are Available in the following Thread Sizes and Bit Diameters

		Available Diameters, in inches															
Type	Thread	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/2	4	4 1/2	5				
SHOULDER	TAPER	x	x	x	x												
	F	x	x														
	113		x														
	H			x	x	x	x	x									
	115			x	x												
	D					x	x	x	x	x	x	x					
BOOTHOMING	K													x	x	x	x
	1" Rope				x	x	x	x	x								
	1 1/4" Rope					x	x	x	x					x			
	400					x	x		x								
	1 1/2" Rope									x	x	x	x	x			
	600										x	x	x				
	700											x	x				
	J7.5														x	x	
	2" Rope													x	x	x	x
	1000															x	

**N**EXT time you buy bits, specify Sandvik Coromant because they give more footage per bit, lower drilling costs. Here's why:

- 1 Only first-quality tungsten carbide is used—as shown in the microphotos above. This means less wear, longer life and a better job.
- 2 The bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.
- 3 The bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels—the most widely used in the world—and Sandvik Coromant extension steel equipment.

*Write or phone today for further details to either of the addresses below:*

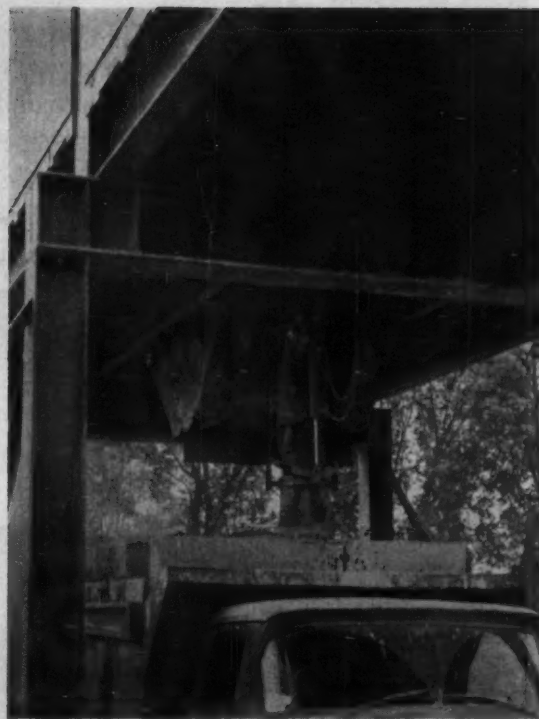
610 Industrial Avenue  
Paramus, New Jersey  
COlfax 1-6800

**Atlas Copco**

930 Brittan Avenue  
San Carlos, California  
LYtell 1-0375



**PIPE UP**—Job-built device lifts rubber loading pipe to clear batch truck. Assembly rides on two rods welded to cement hopper.



**PIPE DOWN**—When truck is in position, air ram pushes pipe down. Device speeds operations, prevents sloppy loading.

Druml rigged up a stiff ribber sleeve to go around the flexible rubber pipe. The sleeve is connected to two metal guide pipes that slide up and down on  $\frac{3}{4}$ -in. rods welded to the bottom of the cement hopper.

The assembly is activated by an air ram with a 1-ft travel. The air ram is electrically controlled by an air valve. The switch controlling the valve is located near the main control panel of the plant so the operator can reach it without moving from his position at the main control panel.

While the truck is moving in under the loading hoppers, the stiff sleeve is up. When the truck is in position, the plant operator lowers the sleeve, guiding the flexible hose into the compartment opening. After the cement has been loaded, the assembly is raised to allow the truck to move on.

#### Men on the Job

For Druml, Karl H. Lotharius is superintendent and Clem Cram is paving superintendent. Walter Kiel is resident engineer for the Wisconsin State Highway Commission.



**CHARGING THE PLANT**—Koehring crane with  $1\frac{1}{2}$ -yd clamshell bucket keeps the aggregate bins full. Plant is automatic type, built by Johnson Co. It's about 1 mi from job.

# NEW FROM DODGE FOR 1960

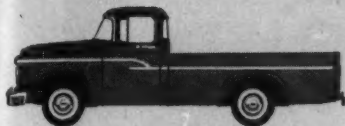
*The thriftiest trucks, in the widest tonnage range, Dodge has ever built . . . including totally new cab-forward models with diesel or gasoline engines.*

Name your job. There's a Dodge truck to do it. For Dodge has never had a line-up as great as this new 1960 truck platoon. Spirited panels and pick-ups that deliver up to 200 horsepower. Rugged stakes with up to 19,500 lbs. G.V.W. Husky 4-wheel-drive models with wheelbases from 108" to 174". All these and more make Dodge your smartest choice for efficient, low-cost hauling. And in the heavyweight class, Dodge introduces a completely new line of cab-forward models, trucks engineered to put real muscle into your biggest jobs, trucks whose new Servi-Swing fenders open with a simple latch and allow you to walk right up to the engine! See your Dodge dealer. He'll be pleased to give you the full Dodge truck story for 1960.

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TRUCKS  
TO SAVE YOU MONEY IN  
A PRODUCT OF CHRYSLER CORPORATION

"JOB-RATED" FROM 4,250 LBS. G.V.W. TO 76,800 LBS. G.C.W.





**SWEPTLINE** pick-ups head their class in looks; lead in load space, power. 4-wheel-drive optional.



**FORWARD-CONTROL** chassis put famous Dodge dependability under the body of your choice.



**VAN** and other special bodies are easily accommodated by most 1960 Dodge trucks.



**TRACTOR** models with compact new 89 $\frac{3}{4}$ " BBC pull longer trailers, bigger legal payloads.



**STAKE** bodies from 7 $\frac{1}{2}$ ' to 14' are built by Dodge on models to 19,500 lbs. G.V.W.



**TANDEM** units provide top hauling strength for dump and other extra-rugged operations.





**ON THE ISLAND**—Euclid belt loader fills 16-yd Euclid bottom dump wagon with silty sand from borrow pit on island in Delaware

River at rate of 1,200 yd per hour. Pair of Cat D8s, one at each end of loader, push and pull it. Ten wagons haul fill average of 2,500 ft.

## Island in River Supplies Fill

**EARTHMOVERS** are taking a calculated risk against floods to work a borrow pit that lies on an island in the Delaware River. The pit is 400 ft from the mainland construction site.

To reach the pit, the contractor built a temporary earthfill dam across the channel between the mainland and the upstream end of the island. The dam diverted the water around the other side of the island. And the channel drained downstream from the dam.

With the dam in place, the contractor built three earth causeways across the dry channel bed to serve as haul roads.

George M. Brewster & Sons,

Inc., Bogota, N. J., holds a contract to construct 4 mi of Route 129 Freeway and relocate existing Route 29, both near Trenton. The firm, to a large extent, based its successful bid of \$4.5 million on this plan to reach the borrow area. Alternative methods included dredging or building a high trestle over the channel. Damming the channel is less costly, but more risky.

### High Production

Right now, crews are working two 10-hr shifts per day to move 400,000 cu yd of earth off the island. In the past, the Delaware River has risen as high as 15 ft above its present stage. If late fall

rains should swell it now, it might break over the dam.

Brewster is maintaining high production—25,000 cu yd per day—with a small equipment spread. Haul distance averages 2,500 ft.

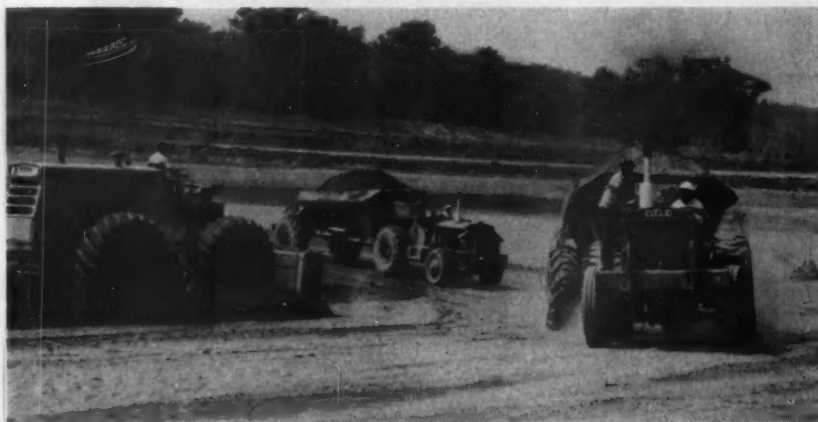
On the island, a Euclid belt loader ploughs silty sand into 10 Euclid 16-yd bottom dump wagons at the rate of 1,200 yd per hour. A pair of Cat D8's, one at each end of the loader, push and pull it.

On the fill, a Michigan 380 rubber-tired dozer works alone to level and spread material after it is dumped. The big machine handles three separate dumping areas and still has time for clean-up work. Brewster also figures that the large tires on the 67,000-lb dozer do a considerable amount of compacting before vibrating rollers are brought in.

The borrow area, 300x3,500 ft, occupies two-thirds of the island. Brewster is cutting 20 ft from the island, including several feet of gravel for the subbase. When earthmoving is completed, they will remove the dam and causeways to restore the channel.

### Men on the Job

R. W. Moore is project manager, E. D. Branham is resident manager, and J. J. Dunn is resident engineer for Brewster. Larry Zazzo is residential engineer and Louis Diehl is inspector for the New Jersey State Highway Department.



**ON THE FILL**—Michigan rubber-tired 380 dozer works alone to level and spread dumped material. Wagons are moving 25,000 yd per day across three temporary 400 ft causeways.

## R.J. RAISCH PAVING COMPANY

800 WEST SAN CARLOS STREET  
SAN JOSE 28, CALIFORNIA

JULY 26, 1968

STANDARD STEEL CORPORATION  
P.O. BOX 5888  
LOS ANGELES 58, CALIFORNIA

ATTN: MR. WES Y. DAVIDSON

DEAR WES:

OUR NEW STANDARD R-M 6000# ASPHALT PLANT HAS BEEN IN OPERATION FOR APPROXIMATELY ONE MONTH AND WE WANTED TO LET YOU KNOW THAT WE ARE THOROUGHLY PLEASED WITH THE OPERATION AND HOURLY PRODUCTION WE HAVE EXPERIENCED. WE CRUISE ALONG AT 275 TONS PER HOUR AND HAVE ACTUALLY HIT 300 TONS PER HOUR. THIS, AFTER LIVING WITH A MUCH SMALLER AND SLOWER 1941 MODEL 3000# PLANT, IS MOST PLEASING TO A COST CONSCIOUS CONTRACTOR.

AS YOU KNOW, WE SPENT MANY DAYS ANALYZING VARIOUS COMPETITIVE PLANTS, AND THE RESULTING PURCHASE OF YOUR PLANT, BASED ON ALL THE DATA WE COULD COMPILE, WAS SATISFIED OUR NEEDS IN ALL RESPECTS.

BECAUSE WE ARE PROUD OF OUR PLANT, AND WISH TO SHOW IT OFF, MAY WE TAKE THIS OPPORTUNITY TO WISH YOU AND ANY OF YOUR PERSONNEL, TO A BIG ONE ON AUGUST 14, 1968, AT OUR PLANT SITE ON MONTEREY ROAD, SANTA CLARA COUNTY AND CITY OFFICIALS WILL BE ON HAND AND WE WOULD ENJOY YOUR PRESENCE.

AGAIN, THANK YOU FOR THE WONDERFUL COOPERATION EXTENDED BY YOU AND YOUR FIELD PERSONNEL. WE BELIEVE US SET UP WHAT WE CONSIDER THE FINEST PLANT IN SANTA CLARA COUNTY. WE THINK IT'S GREAT!

YOURS VERY TRULY,  
RAISCH PRODUCTS, INC.

*Patrick W. Regan*  
PATRICK W. REGAN  
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# "WE CRUISE ALONG OVER 275 TONS PER HOUR!"

"Our new Standard R-M 6000 pound Asphalt Plant has been in operation for approximately one month and we wanted to let you know that we are thoroughly pleased with the operation and hourly production we have experienced. We cruise along at 275 tons per hour and have actually hit 300 tons per hour."

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ASPHALT PLANTS

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## Attention Contractors!

The New STANDARD PORTABLE T.M. PLANT offers top production. A complete self-contained batch type Asphalt Plant...on wheels. One man operates! Has exclusive "SELF-LIFT" erecting device. RUGGED—ECONOMICAL—SIMPLE. Mixes up to 80 tons per hour!

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**HARD-WORKING RIGS**—In a rock cut containing about 430,000 yd of hard shale, Lycoming Construction Co. has a 4½-yd Marion

and a 2½-yd Lorain shovel loading Euclid rear dump trucks. With all their equipment going full blast they average 35,000 yd per day.

## Earthmovers Battle Boulders on

*Some of the seven contractors on the 40-mi. stretch of this road now under construction have to dig out, plug, and blast boulders big as dozers.*

ALL THE TROUBLE dates back to prehistoric times when a glacier deposited its burden of boulders along the path of the Penn-Can Highway near Scranton, Pa.

The seam of sand and gravel that the glacier left behind abounds in out-size boulders, some as big as the body of a dump truck. The seam crops up in several places along the 40-mi stretch of highway now under construction. Some of the seven contractors at work there have been fortunate enough to miss the seam on their sections. But most of them have their hands full dealing with this ice-age legacy.

They have to whittle away at the seam, working around the big boulders that stop scraper operations. Dozers cut out the big ones and push them aside. Then the contractors plug and blast them, breaking them into manageable chunks for shovel loading.

Besides the boulders in the glacial deposit, there is a lot of solid ledge rock. It's mostly fine-grained sandstone and hard shale. There are several rock cuts that contain as much as 1,000,000 yd, but the percentage of rock varies from as little as 10% in some sections to as much as 90% in others.

And the unit price of excavation varies with the amount of rock, from a low of \$0.38 to a high of \$0.95. Average bid price on a typical section with rock and earth evenly divided is \$0.65.

The low price of \$0.38—lowest in this area in years—was bid by No. 1 Contracting Co. of Pittston, Pa., on a 1-mi section at the southern end of the project. It's the first highway job this outfit ever tackled. Until now they limited their activities to strip mining in the coal fields.

### Good Score on First Try

For their first venture in highway earthmoving, they did all right. A small fleet of Euclid TS-24's averaged 5,000 yd per day when they were going full blast. A 2½-yd Northwest shovel, teamed with six Euclid rear dumps, now is cleaning up the little remaining rock out of the total 250,000 yd of excavation.

Gasperini Excavating Co., Inc., Peckville, Pa., holds contracts totaling \$6.3-million for the next three sections. They bid on all 12 sections of the project, and count themselves fortunate that they got three in a row. It enables them to move equipment back and forth from one section to another, concentrating units where they can do the most good at the time.

Altogether they have to move more than 2,250,000 yd of material, about 45% of it rock. It's mostly shovel work. Four big Marion shovels and four Lorains load a fleet of 24 Euclid rear dumps to handle the bulk of the work. But a spread of five Caterpillar DW21's and two LeTourneau-Westinghouse B Tournapulls are moving an average 5,000 yd per day out of the earth cuts.

Gasperini's neighbor on the two adjoining sections, Lane Construction Co. of Meriden, Conn., are having a tougher time of it. Each of their two sections is 3.5 mi long, and each involves 1,700,000 yd of excavation. One cut contains almost 700,000 yd of the boulder-strewn glacial deposit.

Superintendent Bill Tarpley's comments about this trouble spot are mostly unprintable. "They call this stuff earth," he says,



**DRILLING**—Lane Construction Co. drills 6-in. holes in a 14x16-ft pattern for the final 30-ft bench in a 1,000,000-yd rock cut.



**BLASTING**—Powder crew charges holes while twin drills mounted on an Allis-Chalmers tractor bore 3½-in. holes along edge of bench.

## Penn-Can Highway Jobs

"but it's worse than rock. At least you can drill and shoot solid rock. This stuff you can't. The sand around the boulders clogs the bore holes. You can't keep them open long enough to blast the stuff.

"The sand and gravel is not cemented, but it's plenty hard. When it's wet it's sloppy on top, but a few inches below the surface it's hard as rock. We've had three rippers working in there right from the start.

"When we run into big boulders we cut them out with a dozer and push them aside, out of the way, to be plugged and blasted. We are moving most of this stuff with scrapers. Altogether we have three Euclid TS-24's, eight Caterpillar DW21's, and five tractor-drawn Gar Wood pans on the job. Loading is sometimes slow, but our Euclid TC-12 push dozers usually manage to keep the scrapers from getting hung up.

"We also have plenty of solid rock. In fact the 160-ft-deep cut at the north end of our job is the biggest on the entire project. It contains about 1,000,000 yd.

"We've got one more 30-ft bench to go there. An Ingersoll-Rand Quarrymaster drills 6-in. bore holes in a 14x16-ft pattern.

Gardner - Denver Air - Tracs handle the smaller holes along the sides, where we keep charges light to prevent overbreaking the benches. The holes have been dry enough for us to use Nitramon as explosive.

"We keep at least two of our four 3½-yd P&H shovels in the big cut, loading a fleet of 18 Euclid rear dumps. We've been av-

eraging about 100,000 yd per week when all our equipment is working. We hope to clean up earth-moving this fall if the weather gives us any kind of break."

The story is much the same on the next section, where L. G. DeFelice & Son, Inc., of North Haven, Conn., had their share of trouble with the boulders, too. Their contract calls for 1,700,000



**LOADING**—A 3½-yd P&H shovel loads a 22-ton Euclid rear dump at bottom of 160-ft-deep cut. Breaking benches off cleanly minimizes later scaling of the steep rock slopes.

## This Contractor Paves 24-ft Lanes With Two Pavers



**BATCH PLANT**—Lycoming's plant turns out 125 batches per hour with no delays. A 30-in. conveyor charging the aggregate bins keeps space around the batcher free.

yd of excavation. Only about 200,000 yd is ledge rock, but about 25% of the rest consists of big boulders that require blasting.

They tried to get a flying start by opening up the job late last fall. They brought in a spread of pans and ripped through a 4-ft deep frost to loosen the material. But it turned out to be too tough. The frozen ground ripped the bottom out of one scraper. So they called it quits till spring.

Progress has been slow because of the abundance of big boulders. For three months this summer they worked two 10-hr shifts per day. Their earthmoving work is now complete.

Lycoming Construction Co., Williamsport, Pa., is working on the next section as well as two additional sections at the northern end of the project. They have done well by balancing equipment to match conditions.

### An Array of Rigs

A Euclid loader teamed with 13 bottom-dump wagons handled the big earth cuts. An array of high speed scoops, including seven Euclid TS-24's and four Caterpillar DW21's, plus four Caterpillar tractor-drawn pans, divided the



**FEEDING PAVER**—One of the 16 batch trucks on the job travels over a 26-ft-wide haul road alongside lane to deliver dry batches to a Rex 34E Paver, one of two on the job.

smaller earth cuts. In the rock cuts, five Lorain 2½-yd shovels and two Marion 4½-yd shovels loaded a fleet of Euclid rear dumps.

They hit a peak production rate of 35,000 yd per day when all this equipment was rolling. Now earthmoving on all three sections is virtually complete. And one section is already paved.

They are now cleaning up a 90-ft-deep rock cut that contains about 430,000 yd of hard shale. It shatters easily, and shots have to be kept light. The stratum runs close underneath some houses only 50-ft back from the top of the cut, and vibrations transmitted through the seam by the blasts could easily damage the foundations.

So Lycoming works carefully in this cut. An Ingersoll-Rand Drillmaster places 6-in. bore holes in a 14x15-ft pattern. They load the 25-ft-deep holes with ammonium nitrate primed with Atlas Giant 75. Sixteen delays separate each shot into sections containing no more than 130 lb of explosive. Powder use averages about 0.65 lb per cu yd.

The two sections between Lycoming's split jobs are a study in

contrasts. On the short section recently completed by Central Pennsylvania Quarry & Stripping Co., the material was 90% rock, most of it in one big cut containing almost 1,000,000 yd.

### Working Two Shifts

They averaged 3,000 yd in a 20-hr day with a 5½-yd Lima and a 2½-yd Northwest loading a fleet of five Euclid rear dumps and five International Payhaulers. Five LeTourneau-Westinghouse B Tournapulls took care of the thin earth cover over the rock.

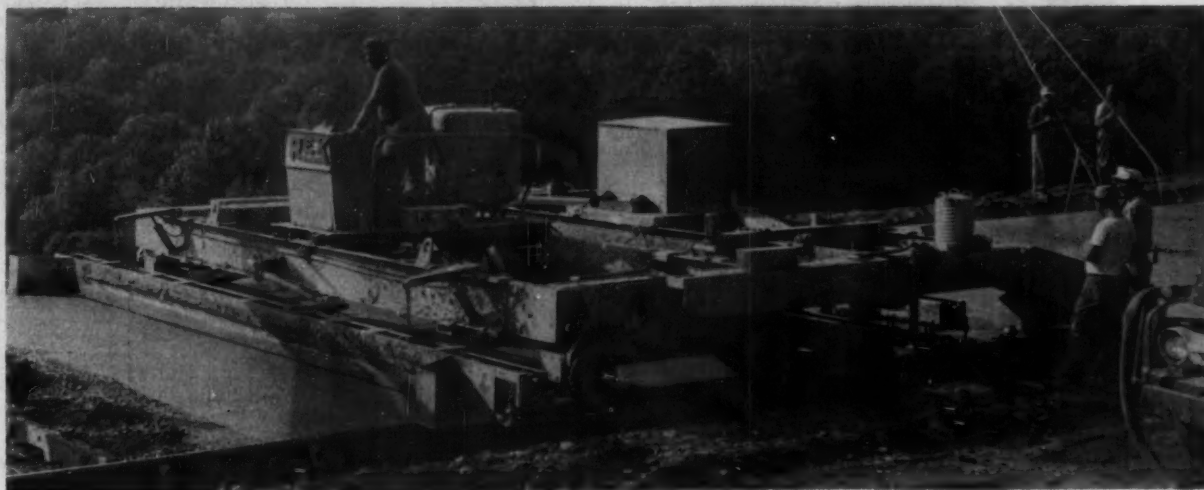
On the other section, H. J. Williams, Inc., of York, Pa., ran into only 10% rock. They polished off the bulk of their earthmoving with a Euclid loader teamed with two dozen bottom dump wagons. At the start, construction of a double-box culvert held up earthmoving because it delayed placing a 1,000,000-yd fill that accounts for most of the material.

But when they got going they found it easy to average 14,000 yd per day. Fortunately the small amount of glacial deposit that they encountered contained no big boulders, except a few on top, where it was easy to get at and shoot them.



**PLACING CONCRETE**—Paver dumps 1-yd bucketfull of concrete at edge of steel bulkhead at end of day's pour. Contractor averages 2,400 ft of pavement per day.

**FINISHING CONCRETE**—A Rex finisher-float is the last machine in the paving train. The transverse drag float at rear takes the place of a longitudinal float.



### Steel Strike Delays Paving

Williams has set up a batch plant for paving their own and Central Penn's sections, but they had to postpone paving until next spring—reinforcing steel was not available in sufficient quantity because of the steel strike. Williams will also pave Gasperini's three sections at the other end of the project, where they will install another batch plant. The other contractors will handle their own paving.

The big question each has to settle is whether to pave single 12-ft lanes or the full 24-ft width. The specs allow either method, but paver and batch trucks must be kept off the lanes. And this means building a haul road alongside each lane.

Lycoming elected to pave the full width, and it worked out well for them. It makes for a more efficient operation, with no back-tracking. And sawing the longitudinal joint between lanes is no trouble.

The two 24-ft-wide lanes are on different levels, one about 10 ft higher than the other, along much of the route. The two-level design reduces the volume of ex-

cavation by taking advantage of the numerous side-hill cuts. (It will also benefit motorists by cutting down headlight glare.)

Lycoming took this into account when they worked out their earthmoving plans. They decided not to cut the median strip to final grade until after all paving was completed. Instead, they left an extra broad shoulder alongside the upper lane and cut a sort of ditch at the other side of the median strip along the lower lane.

The strip along the upper lane was wide enough to accommodate a haul road from which their pavers worked. When paving of the higher lane was completed, they cut down the shoulder, pushing material into the ditch by the lower lane to form a haul road there.

Final grading of the median strip after paving was completed was simple. There was no need to bring in additional material or cut out any. They had done a good job in figuring their earthmoving scheme.

Lycoming paved the 4.6-mi section in about five weeks, averaging 2,400 ft of 10-in.-thick concrete pavement per day. Two

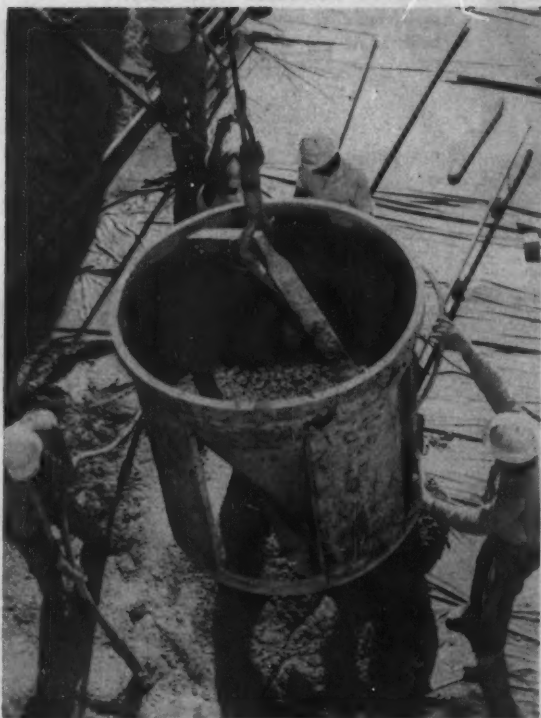
34E pavers, a Koehring and a Rex, headed a train that included a spreader, a spreader-finisher, and a finisher-float, all manufactured by Rex. The 42-in.-wide transverse drag float on the last machine took the place of a longitudinal float.

A fleet of 16 batch trucks delivered dry batches from a centrally located batch plant. Separate Johnson cement and aggregate batchers turned out 125 batches per hour.

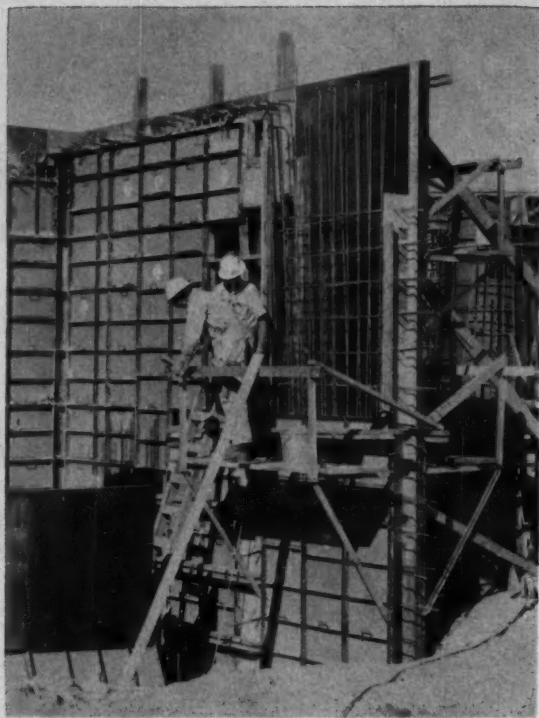
There were no delays at the batch plant throughout the paving period. A 30-in. conveyor, charged by a Lorain truck crane with 2½-yd clam, kept aggregate flowing steadily into the bins. In addition, batch trucks could pass beneath the conveyor and circulate freely around the batcher.

### Completion Next Fall

The portion of the Penn-Can project now under way is scheduled for completion by October, 1960. There should be no trouble meeting that target date. Assistant District Engineer Tom Harrington is in charge of supervision for the Pennsylvania State Highway Department.

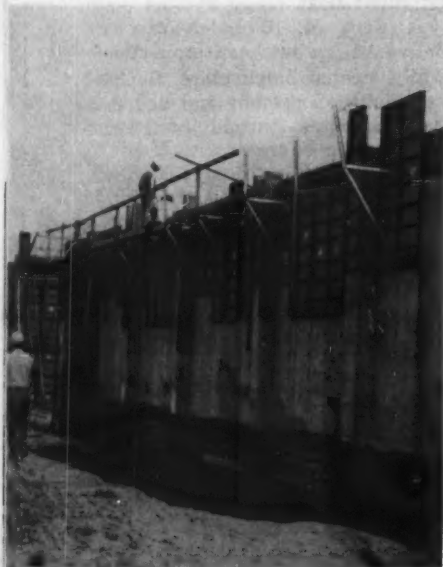


**POURING**—Concrete for the base of the flame bucket is a high grade material. But it's a stiff mix and needs careful vibration.



**FORMING**—Working space is so limited that there is no room for equipment capable of placing, stripping, and moving heavy forms.

## Missile Base Is Rough Job



**STRIPPING**—In these cramped quarters, Symons forms are easy to break down and shift about either by hand or truck.

**BUILDING** these Atlas missile bases is something like putting on a tuxedo in the upper berth of a Pullman car. It takes some careful wiggling around.

That's the experience of J. Hilding Johnson, Inc., of Gary, Ind., in constructing structures for an Atlas intercontinental ballistic missile installation near Omaha, Neb. The work is being carried out under a sub-contract for Malan-Grove of New York, N.Y. (Malan-Grove, Shepherd, Wilson and Kruege, Inc., which holds \$12.9-million prime contract for the base.)

The job is composed of three missile launching complexes, located near Arlington, Neb., Mead, Neb., and Missouri Valley, Iowa. At each complex Johnson is building a combination launch control and guidance building, a combination powerhouse and pumphouse, and three launchers—each shaped like an oversized pencil box—in which the 75-ft missiles are stored in prone posi-

tion against the day when the flat slab roof is rolled aside and the birds hoisted to vertical position to be sent off.

None of the structures is major in size. The structural concrete in the over-all job totals only 33,000 cu yd; the backfill is only 30,000 cu yd; and the reinforcing steel amounts to only 2,000 tons.

### Too Little Working Space

Yet the job is far from simple. The controlling condition is that the work should be handled with heavy equipment, yet the job just doesn't permit it. There is no freedom to spread out. It's a job that is fussy, cramped, and irritating.

What makes it worse is that the job is on a crash schedule (the start was in May, and the structures are to be closed in by cold weather). To meet the deadline, work must go on simultaneously almost everywhere; there's scant opportunity for leapfrogging or repetitive practices. And to date

# PAVING RECORDS IN 14 MONTHS!\*

Using Heltzel Flex-plane Combination  
Finisher-float Machines

\*Paving records established  
using the Flex-Plane "Com-  
bination"

**1** SARGENT CONSTRUCTION CO.,  
Saginaw, Michigan, July, '58.  
5787' of 9" x 24' slab in 12½  
hours.

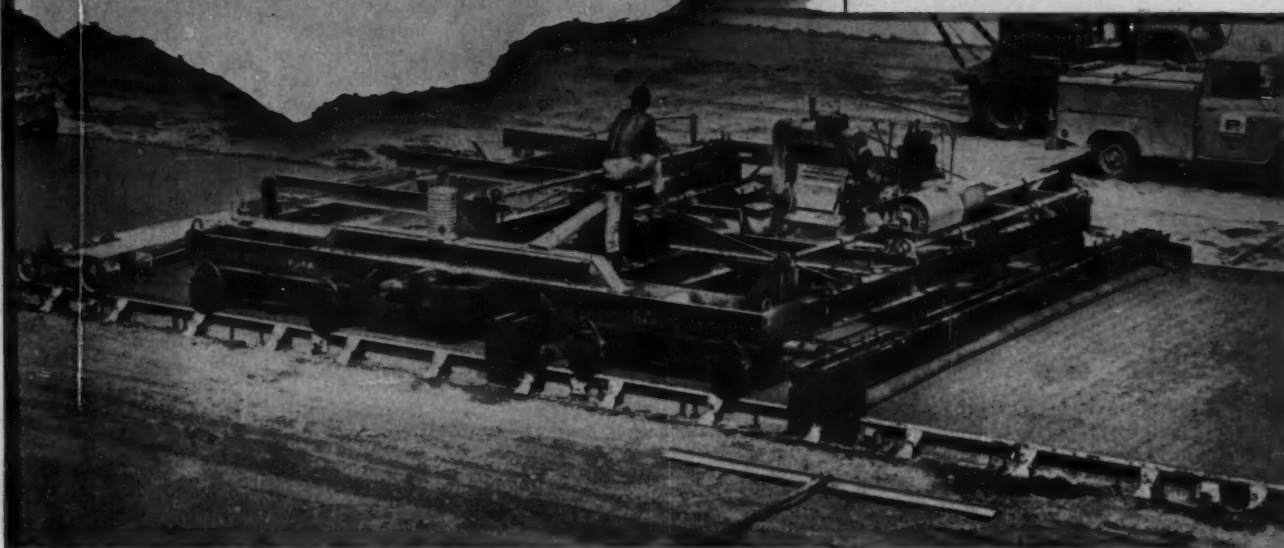
**2** DENTON CONSTRUCTION CO.,  
Grosse Pointe Woods, Michi-  
gan, Aug. '58. 6029' of 9" x  
24' slab in 12½ hours.

**3** KOSS CONSTRUCTION CO.,  
Des Moines, Iowa, June '59.  
6067' of 9" x 24' slab in 12½  
hours.

**4** PIERSON CONSTRUCTION CO.,  
Saginaw, Michigan, August,  
'59. 6244' of 9" x 24' slab  
in 12 hours.

Canadian Record:

**5** HURON CONSTRUCTION CO.,  
Chatham, Ontario, July, '59.  
5290' of 9" x 12' slab in  
12 hours.



**Michigan contractor finishes 6244 feet of 9" x 24' pavement  
in 12 hours...paves 5 miles in 5 consecutive working days!**

The most recent of 5 paving records has been achieved by Pierson Contracting Company of Saginaw, Michigan. From Saturday, August 8th through Thursday, August 13th, they paved 26,526 feet of 9" x 24' pavement on U. S. 12 near Hartford, Michigan. Total hours worked—52.

On Tuesday, August 11th, 6244 feet were paved in 12 hours for the longest single day's run—and another new U. S. paving record.

Speed is not the final measure of a finishing machine's worth. But the ability to produce a finish that meets or exceeds State and Federal specifications, plus the capacity to do it faster and more economically, is important to every paving contractor. Several of these record-setting contractors have stated that their record runs would not have been possible without their "Combinations". Further proof that top-rated contractors depend on Flex-Plane top-rated finishing equipment.

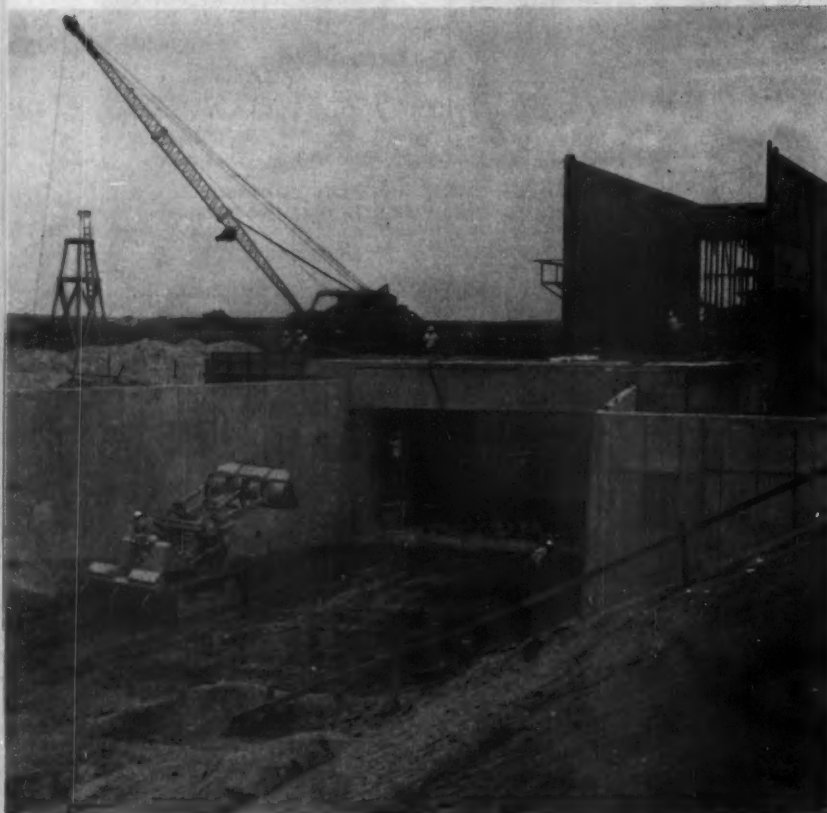
If you haven't seen the record-breaking 1959 Flex-Plane Gas-Electric Combination Finisher-Float Machine, call your Flex-Plane Distributor today or write direct to:

(above) Pierson's record-setting "Combination" at work on U. S. 12, Hartford, Michigan.

(below) Huron Construction's '59 Model Gas-Electric "Combination" setting new Canadian record.



**THE FLEXIBLE ROAD JOINT MACHINE CO.** Warren, Ohio



**FOUNDATIONS**—Some slabs rest on backfill, and compaction specs are exacting. Heavy rains made it necessary to dig out some material, aerate it, and replace it.

there have been more than 20 change orders. As if all this were not enough, last summer was so wet that the amount of rainfall in excess of normal was greater than the total annual rainfall of some recent years.

One way Johnson has tried to tidy up this tangle has been the use of Symons forms. They have on hand 100,000 sq ft of them. Although the total amount of concrete is relatively modest, there is approximately 900,000 sq ft of surface to be formed.

Actually the job layout would allow up to 10 to 15 reuses of forms; and that might make job-built wood forms economical. But it's a crash job; scheduling limits reuse to a maximum of three times. Building special wood forms would cost too much.

There are some fairly heavy walls, too. The concrete walls are only 6 in. thick on some structures, but they range up to 2 ft thick on others. The launchers, 101x134 ft in overall dimension, have portions in which a single

wall is 70 ft long and up to 24 ft high. Yet the job is too cramped to accommodate equipment capable of placing, stripping, and moving heavy forms. The Symons forms are easy to break down into individual panels for shifting about either by hand within a single structure or by truck from one structure to another.

The Johnson firm credits the forms in substantial part for high quality workmanship in the placing of concrete. Specifications require a high grade material, with a 5½-bag mix for Class A and a 5-bag mix for Class B concrete and a slump ranging from a minimum of 2 in. to a maximum of 3 in. This makes for a stiff material. Complicating its placement are the reinforcing bars in the forms and a requirement limiting the height of dump to 5 ft. Johnson's procedure is to pull a panel from the wall forms at vertical intervals of not more than 5 ft, placing the concrete through the opening and using it as a hatch to work vibrators. The result has been

virtual freedom from honeycombing and voids.

Foundation preparation has been a tough problem. Many of the floor slabs rest on backfilled material, and the requirements for soil placement and compaction are exacting, with both maximums and minimums prescribed. Soil beneath the launch and service building must be in the 88-92% density range and 0 to 2% above optimum moisture during placing. Soil under the buildings elsewhere must have 85-90% density and be 3-5% above optimum moisture content.

### Big Machines Can't Work

The soil and density requirements are tough to achieve because heavy compaction equipment can't work in the cramped space. Many of the areas to be backfilled are V-shaped trenches, and the compactors must work around support columns of various kinds. Johnson uses vibratory compactors where they can, but even these compact devices are too clumsy for much of the work. Chief reliance has been on Wacker mechanical tampers. Johnson has put as many as 10 of these rigs to use in a single work area.

The compaction so laboriously gained has been repeatedly canceled out by heavy rainfall. Johnson went to the expedient of lining excavated areas with tarps to keep them dry, but even then seepage was a problem.

Pits had to be pumped out and compacted soil removed, dried out, then put back again. Here again cramped working space made it impossible to use big equipment. Johnson had to bring in farm equipment to aerate and dry out the soil sufficiently for placement to go ahead.

### Men on the Job

Project manager for Johnson is Bernard O. Benson. L. R. Berquist is project engineer. Wayne Altwegg is office manager.

The Atlas base is being constructed by the Omaha District of Army Engineers, of which Col. David G. Hammond is district engineer. Jerome O. Ackerman is chief of engineering, Ed Soucek is chief of design, and Ralph Rader is chief of military construction. Air Force civil engineer for the Missouri River region is Col. James S. Caples.

# Ingersoll-Rand Drilling Team Speeds Work on **MILLION-YARD ROAD CUT**



## ***CRAWL I-R Drills and Gyro-Flo Compressors cut cost of rock removal on Pennsylvania highway job***

Where this high-speed I-R drilling team is now at work, a mountain of rock will make way for a new high-speed highway—on Route 29 between Nesquehoning and Hazelton, Pa. This 2½ mile cut requires removal of a million cubic yards—40% of it hard rock.

To assure top efficiency and minimize the possibility of delays, the contractor, J. H. Beers Construction Co., put the following Ingersoll-Rand equipment on the job:

Three CRAWL-IR drills

Four 600-cfm Gyro-Flo compressors

One 125-cfm Gyro-Flo compressor

One Hydra-Boom Drilling Rig with two drill mountings and a 900-cfm Gyro-Flo compressor

I-R Carset bits and carburized drill steels are used on all drills.

The CRAWL-IRs, drilling 3½" holes 24 to 26 feet deep, are averaging between 400 and 450 feet per shift in hard sandstone. The Hydra-Boom rig is drilling 3½" holes 26 feet deep at 804 feet per shift.

These completely mechanized, self-propelled blast hole rigs convert setup time into *drilling time*. And the Gyro-Flo rotary compressors provide an abundant supply of 100 psi air, with practically no attention or maintenance.

Whatever your drilling requirements, Ingersoll-Rand has the equipment that's *right* for the job! And your I-R Distributor can let you have it on a sale or rental basis—whichever works out to your best advantage.

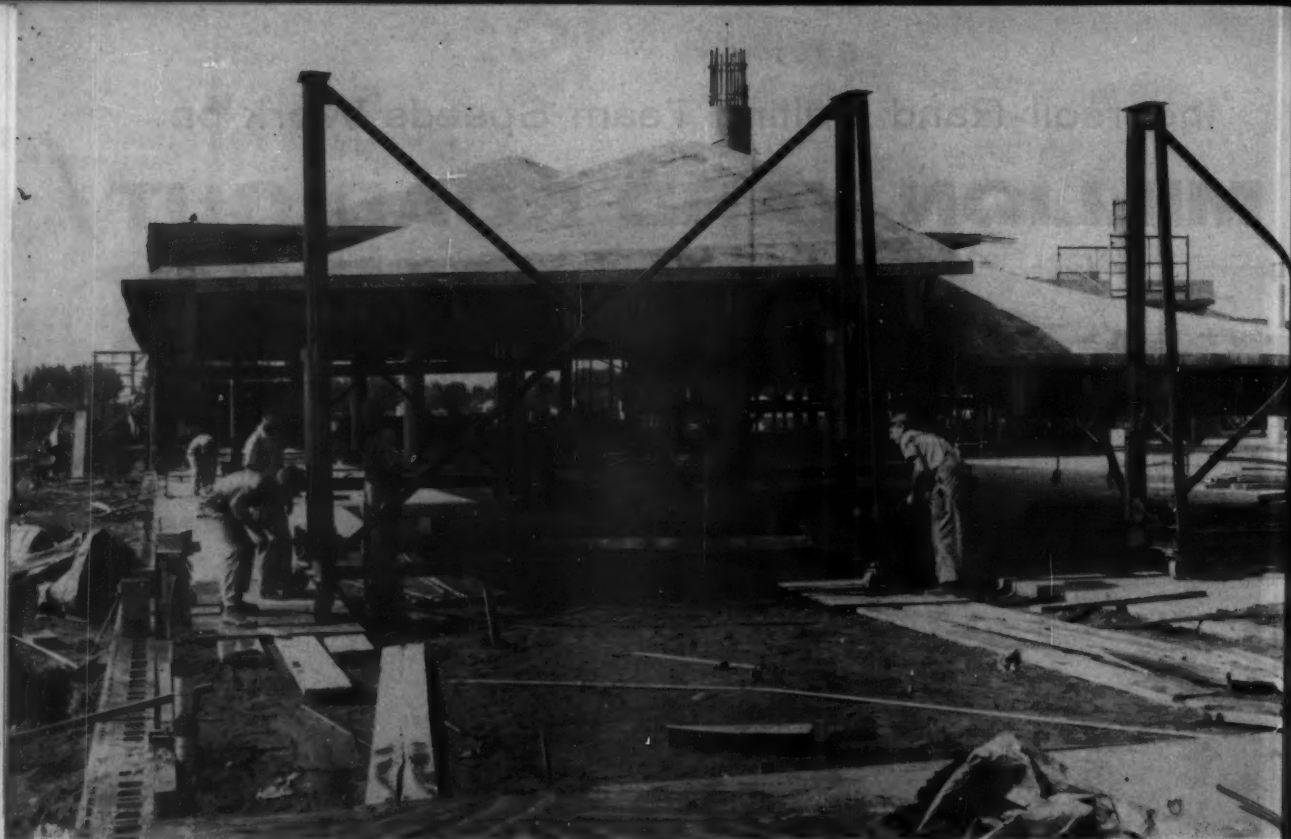
## **Ingersoll-Rand**

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A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR ROCK DRILLING



**ON THE MOVE**—A pair of contractor-designed rigs move and position a form section for half of a hyperbolic paraboloid roof shell. Each of the plywood-covered form sections weighs approximately 5 tons. Only four sets of forms were used to pour 44 shells.

## Travelers Raise Forms, Lower

*Two pairs of special rigs move and position each form 11 times to build a big umbrella roof at a cost of only 97¢ per sq ft.*

By GORDON MADSEN  
George W. Madsen Construction Co.  
and DUTTON BIGGS  
Structural Engineer

**OUR FORMING SYSTEM** enabled us to maintain an unusually tight schedule in pouring 44 hyperbolic paraboloid roof shells for the Bloomington Development Shopping Center in Minneapolis. With four sets of forms we put up 18,000 sq ft of roof a week.

The shopping center is 196 ft or four umbrella units wide. Its length is 511 ft or 11 umbrella units. Roof height at the edge of the shell is 14 ft; at the column it is 22 ft 5 in. One 2-ft-dia column supports each roof section.

Each umbrella shell is 46 ft 4 in. wide and 48 ft 6 in. long. Shell thickness is 3 in. Including edge and ridge beams, a shell has an average thickness of 4 in. and contains 30 cu yd of concrete.

The roof covers 100,000 sq ft. Our method of forming and pouring the 44 individual umbrella roof shells resulted in a construction cost of 97¢ per sq ft for columns and concrete shells in place.

### **Building the Forms**

A set of forms consisted of two sections each covering half of one umbrella. To simplify the moving operations, we kept the weight of the forms to a minimum.

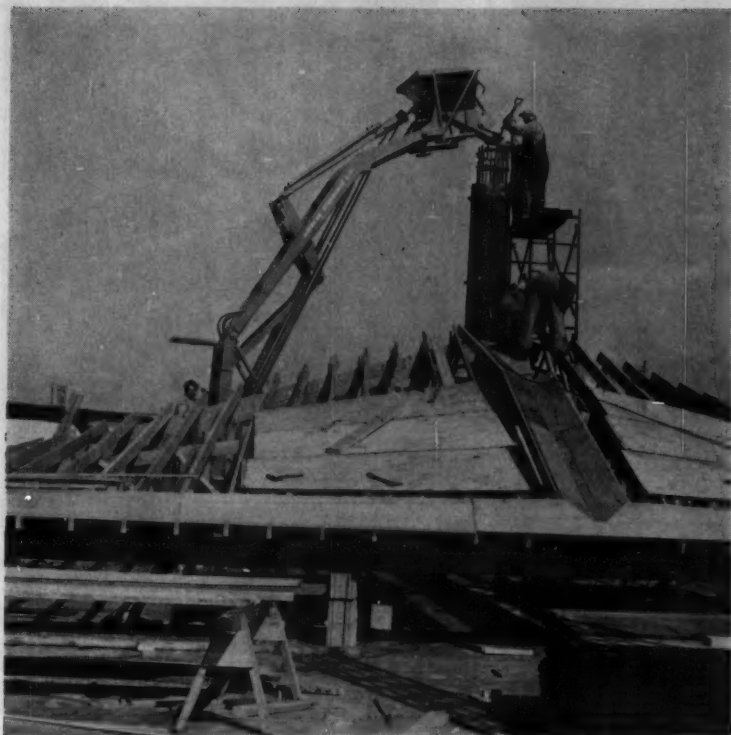
Our carpenters constructed lightweight wood support trusses entirely by nailing. The trusses supported the weight of the forms only during the moving operations. When in place, timber shores on 5-ft centers carried the weight of the concrete. In spite of the lightweight construction, each form section weighed 5 tons.

The doubly curved surface of a hyperbolic paraboloid is gener-

ated by a series of straight lines. This permitted us to use straight sections of lumber for the top chord as well as for the 2x6 stringers.

The deck of the form was covered with  $\frac{3}{4}$ -in. plywood. It warped easily to fit the curvature of the roof surface. Screw-type nails held the plywood in place. We arranged the stringers so that as many full sheets of plywood as possible were used. After disassembling the forms at the completion of the job, we salvaged a considerable stockpile of plywood.

At the start, our carpenters were completely unfamiliar with this type of form. So we took a small crew and allowed them ample time to figure out all the trusses, stringers, and complicated beam intersections. It took three men two weeks to complete the first form. But seven men built



**SUPPORT COLUMNS**—Econmobile with 1/2-yd hopper pours column. On the ground, a form section is taking shape. It incorporates as many full sheets of plywood as possible.

## Cost of Roof

the last of the four forms in only two days.

All form decking was mitered to achieve a better finish. Where joints did not fit tight, we caulked them with a plastic Fiberglas material.

Cost of the forms was slightly under our bid of \$1.33 per sq ft. Based on 11 uses per set of forms, this cost was about 12¢ per sq ft.

### Reinforcement

Tying the roof shell to the column was another problem because the reinforcing bars were long and heavy. Using U-shaped loop bars in the tops of the columns simplified the steel placing. The bars were placed with the curved portion up, and roof steel was tied to the loops. The open ends of the bars were tied to the column steel in a construction joint about 3 ft below the shell.

We placed steel in the ridge beams first to avoid the necessity of threading large reinforcing bars through the loops. We also added a splice in the ridge steel

approximately 6 to 10 ft from the column to cut down the length of the bars. This further simplified the placing of steel because our men did not have to handle extremely long bars. We used about 2.25 lb of hard grade reinforcing steel per sq ft of roof.

### Concrete Placing

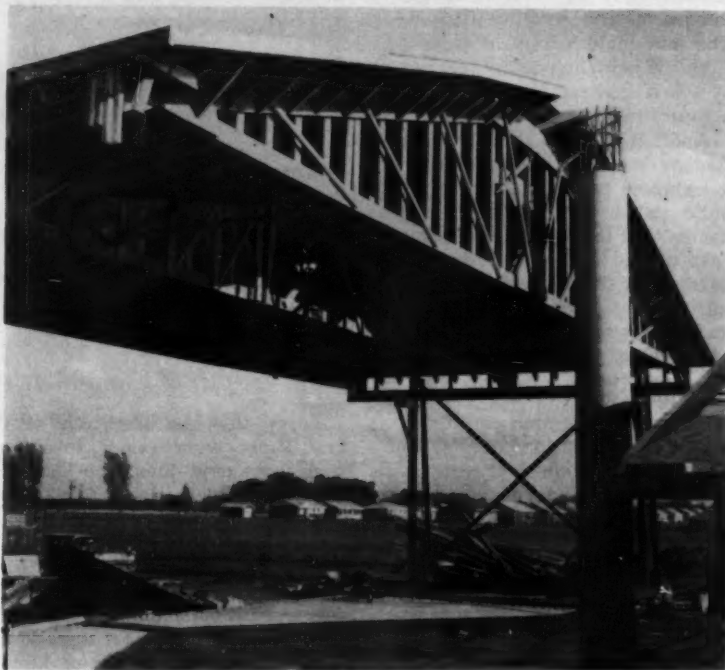
The schedule called for pouring eight roof shells in a week with the four sets of forms.

As soon as the carpenters completed the first form, we erected it into position and placed the steel. We poured concrete in this section on May 13. The following week we completed two shells, the next week three, and the fourth week six.

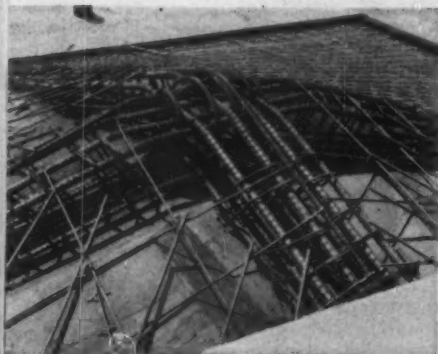
Starting June 8, construction proceeded at the scheduled rate with four sets of forms. We completed the last of the 44 shells on July 17.

An American Econmobile was the workhorse in pouring concrete. We used it with a 1/2-yd hopper to pour the columns. For the roof shells we equipped it with a boom extension and a 3/4-yd bucket. With this equipment it could reach 30 ft, but this was not enough to cover the 46x48-ft roof sections.

*continued on next page*



**IN POSITION**—Form travelers raise half of a form section for one roof shell. When forms are in position, timber shores under trusses support the weight of the concrete.



**ROOF STEEL**—Ridge steel is tied to column with loop bars spliced to column reinforcing in a joint 3 ft below roof shell.

A movable platform large enough to accommodate two men with wheelbarrows licked this problem. We placed the platform on the roof form within reach of the rig's boom. The bucket discharged into the wheelbarrows on the platform, and they placed the concrete in areas that the Econmobile could not reach.

One critical item in the work cycle was the length of time required to bring the concrete up to strength. Design was based on a strength of 3,750 psi at 28 days. Engineers' specifications allowed form stripping at a job-cured cylinder strength of 3,200 psi.

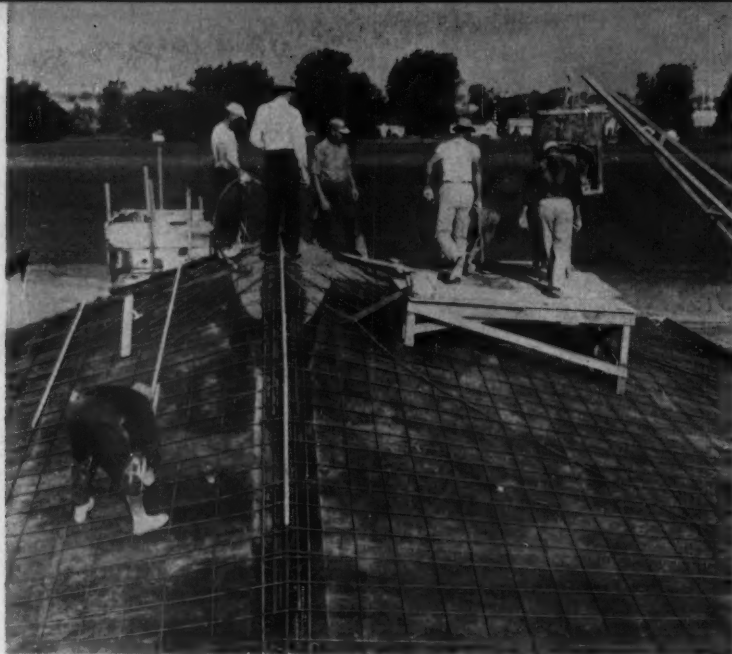
By using high-early strength cement, only 44 hr were needed to cure the concrete for stripping. The mix included seven sacks of Type III cement per cu yd and 3 to 4% air entrainment. We used a retarding agent on hot days.

Another critical item was excessive deflection at the corners—a common problem with hyperbolic paraboloids. Sloped edge beams that tended to lift the corners of the shell controlled and evened out the deflection. On this job the deflection was  $\frac{3}{4}$  in. for both the corner and the midpoint of the edge.

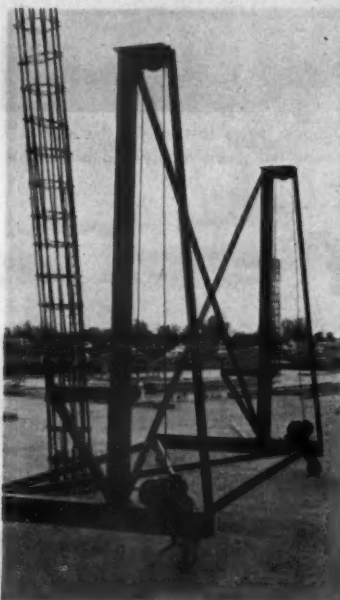
### Stripping and Moving

A crew of five men could strip, move, and position one set of forms in less than 4 hr.

Before placing concrete we sprayed the top side of the forms with oil. The 45-deg slope of the edge and ridge beams also helped start the stripping action. In most cases the weight of the form was sufficient to remove it from the concrete. Where this didn't work, we drove wedges under one corner to start the stripping.



**CONCRETING**—A movable platform accommodates two men with wheelbarrows. They place concrete in areas the Econmobile with boom extension and  $\frac{3}{4}$ -yd bucket cannot reach.



**FORM TRAVELERS**—Four specially designed rigs with hand winches move and position forms. Rigs are 13 ft 6 in. high.

Forms that had been used several times were easier to strip than were new ones. The longest stripping time on a new form was 1 hr—the shortest on a used form was 5 min.

The four rigs that we used on this job to move and position the forms were particularly valuable. We designed the rigs ourselves, and Stanley Iron Works of Minneapolis built them for us.

Each consisted of two braced

columns mounted on a frame on four casters. The rigs were 13 ft 6 in. high and could be moved under the 14-ft ceiling. A bracket traveled up and down each column and supported the forms during moving and raising operations. A 2-ton Beebe hand winch operated each bracket.

### Work Schedule

A typical work cycle for one umbrella section required three days: At 8 am on Monday we stripped a set of forms and moved it into position for the next roof section. This operation required slightly less than 4 hr.

At noon that same day the forms were ready for steel. It took approximately 3 hr to place the reinforcing for one section.

On Tuesday morning we poured concrete; it was ready for curing at noon. Curing required 44 hr. Thursday morning the forms were stripped, and the cycle was resumed again.

By staggering the cycles we maintained a continuous work schedule resembling an assembly line operation. This resulted in economical concrete work.

Architects for the Bloomington Development Shopping Center were Manuel Morris & Robert E. Sixta of Kansas City, Mo. The supervising engineer was Ben Mayeron of the Mayeron Engineering Co., Minneapolis. The structural engineer was Dutton Biggs of Kansas City, Mo. George W. Madsen Co. of Minneapolis was the contractor.

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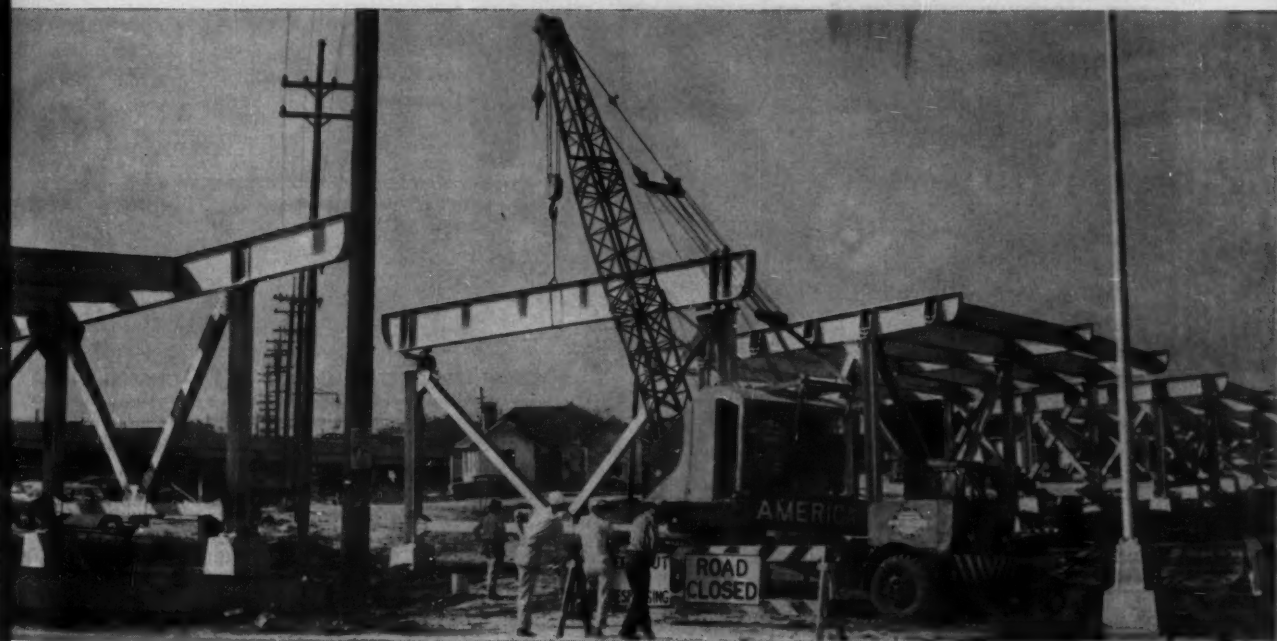
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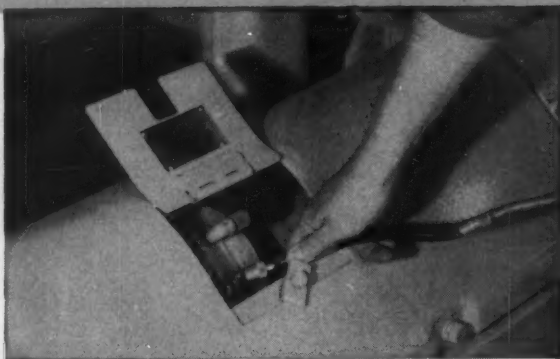
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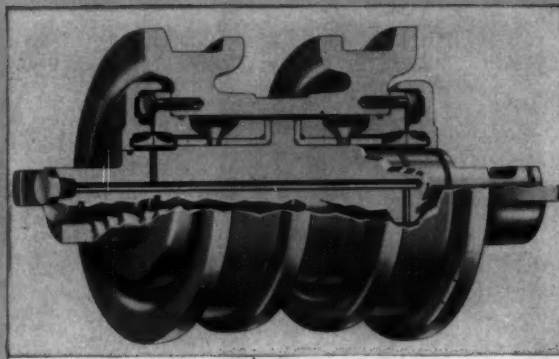


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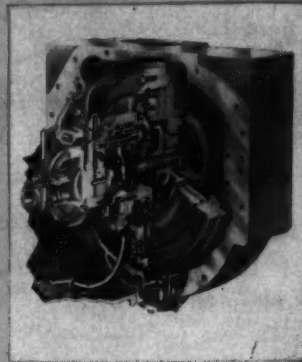
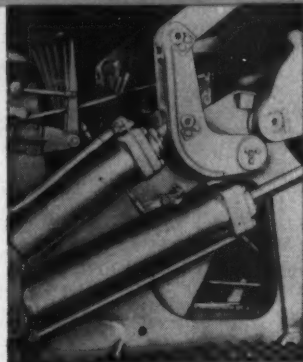


**HYDRAULIC TRACK ADJUSTERS** standard on the No. 977 and No. 955—optional on the No. 933. An ordinary grease gun is all that's needed to adjust tracks. Just open the inspection door and apply a few strokes. The hydraulic cylinder does the rest.



**LIFETIME LUBRICATED ROLLERS.** They need no lubrication servicing until rebuilding. Heat-dissipating oil lubricant is retained by dirtproof floating-ring seal. Eliminate on-the-job roller lubrication. Keep machines on-the-go for longer periods of time.

**SMOOTH-FLOW BUCKET CONTROL LEVER.** The inside lever is pulled back, lifting the load. It locks in this position until it is kicked out at maximum height by the lift cylinder and linkage. After dumping, both levers are pushed forward. The bucket lowers but only tilts back to an adjustable, preset digging position. Linkage then kicks the outside lever, stopping the bucket tilt.



**EXCLUSIVE CATERPILLAR OIL CLUTCH**... the most advanced clutch design ever offered. Provides up to 2,000 hours without adjustment. This is equal to about 12 months of "adjustment-free" operation. And because wear rate of clutch facing is so slight, down time for clutch repair is almost eliminated.

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# DEPENDABILITY

## IN A TRAXCAVATOR

**WHATEVER THE JOB...** whatever the conditions... there's a Caterpillar-built Traxcavator to take charge. Advance design has given this machine a reputation for speed... efficiency... low operating and maintenance costs. For this is a digging and loading tool; not a tractor attachment.

The line is complete. You get top production from three Traxcavators... the No. 933—52 HP,  $1\frac{1}{8}$  cu. yd. bucket; the No. 955—70 HP,  $1\frac{1}{2}$  cu. yd. bucket; the No. 977—100 HP,  $2\frac{1}{4}$  cu. yd. bucket. And there's a complete range of quick-change attachments... special buckets, bulldozers, forks, the exclusive side dump bucket and the rear-mounted ripper.

Traxcavators are built to last. They have a heavy steel main frame, welded into a one-piece unit. Box construction track roller frame absorbs the loads and stresses of tough treatment. Lift arms are made to stand up under the strain of heaviest digging conditions.

Traxcavators give you fast action and ease of operation. Excellent stability and balance give better control of the machine. A fast hydraulic system cuts cycle

time and increases maneuverability even in close quarters. Visibility is excellent. The high seat puts the operator on "top" of the work. Operator's compartment is uncluttered. Tractor controls are conveniently located for handling ease. Bucket controls are at the right armrest... closely spaced for dual operation with one hand.

The reliable Caterpillar Diesel Engine has a fuel-saving injection system and ability for hard lugging. Each engine is matched to the machine for power and bucket size.

All of these features pay off in top production. Let your Caterpillar Dealer help you choose the Traxcavator best suited for your job. Get production facts and figures. And ask for a demonstration.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

# CATERPILLAR

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**BOOST PRODUCTION  
AND LOWER COSTS WITH  
A VERSATILE TRAXCAVATOR**

# Dynamite Shoots Rock and Soil, Dredges Dig the Whole Canal



## BLASTING

Overburden and bedrock go at the same time. Biggest blast on the job comprised 4,750 holes. More than

12,000 caps fired 123,000 lb of dynamite to break up 36,000 yd of rock and 90,000 yd of overburden.

*Dynamite and dredges team up to dig a canal. Bedrock and overburden are shot together, and excavating the big ditch becomes a dredging operation.*

NO EARTHMOVERS work on this canal job. Dredges do all the excavating after the rock and overburden are blasted.

Skanska Cementgjuteriet AB, Swedish general contractors, are building a 4-mi shipping canal about 90 mi southwest of Stockholm. It will cut off a sharp bend in the Motåla River between Braviken fiord and the entrance to the port of Norrköping. The contractor is moving about 5,230,000 yd of dirt including 260,000 yd of rock.

Soil in the Lindo Canal area consists mainly of glacial drift or moraine. It lies on the bedrock

and is covered by a layer of clay. The irregular rock requires blasting at about a dozen points along the canal.

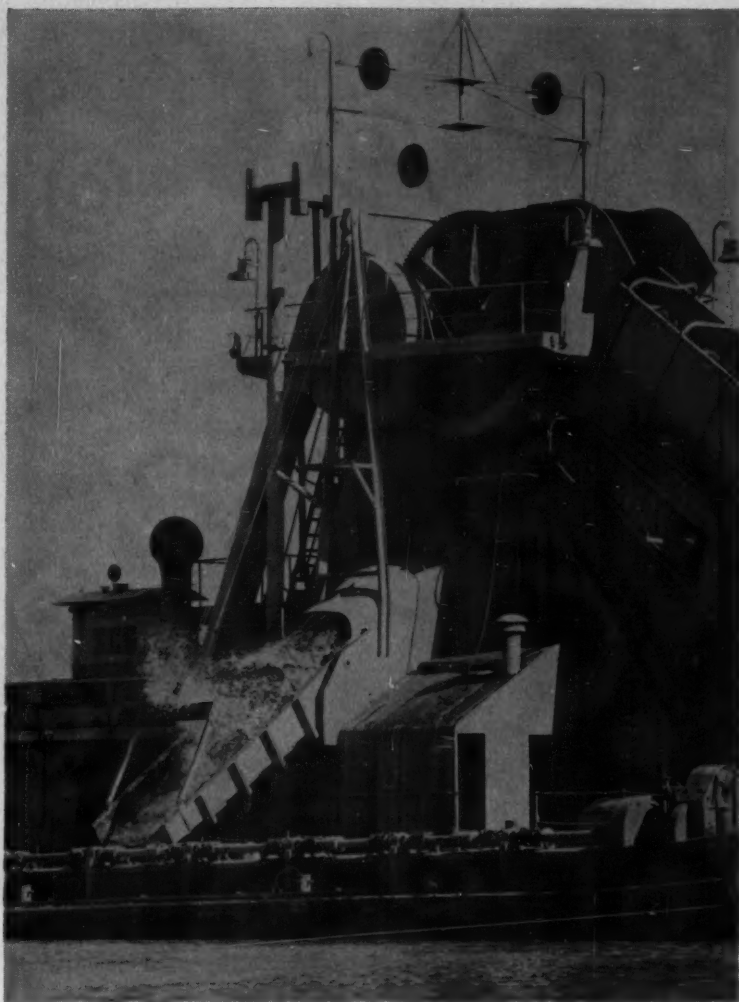
Conventional earthmoving would have been too troublesome. The large boulders in the moraine are too hard to handle. So the contractor is blasting both the rock and the overburden at the same time and using dredges for the entire excavation.

### Modified Drills

Special rigs were built for the drilling operations. The basic unit is an Atlas Copco BBC 43 rock drill. A special device sub-

stituted for the conventional rotation mechanism gives it greater torque for drilling. The device rotates both a drill pipe and the drill steel running through the pipe. Likewise, the hammer blows are transmitted to both the pipe and the steel.

The pipe and drill steel are sunk simultaneously through the overburden with the help of powerful jetting. The pipe is collared approximately 6 in. into the bedrock. Then it is uncoupled from the drilling action, and the hole is continued in the usual manner by the drill steel alone. After the full depth is reached,



## DREDGING

After the blast, excavation of the canal becomes entirely a dredging operation. Dredges will remove a total of 5,230,000 yd of dirt.

the steel is withdrawn leaving the pipe as a lining in the overburden section of the hole.

Masts for the Lindo drill rigs were built with 52-ft feeds. With this equipment they can drill to a depth of 65 ft through difficult moraine containing large boulders.

The rigs are mounted on I-beam frames. These in turn run on tracks built of steel sheet piling. This arrangement allows for transverse and longitudinal movement of the rig over the drilling area. Wagon-mounted versions of the rigs also were used.

Three Atlas Copco AR 3 and one AR 4 compressors supply the air. Output is 565 cfm for the AR 3 and 700 cfm for the AR 4.

The drill steel is 1½ in. in dia

with a 2-in. (51 mm) drillcrown. Drill pipe outside diameter is about 2¾ in. Carbide teeth are fitted into the annular cutting head of the drill pipe. The drill rod is tipped with a 2-in. detachable four-point bit with Coramant inserts.

## Slanted Holes

With this equipment drilling speed in rock averages about 80 ft per hr. Maximum speed is about 120 ft per hr. In a typical section the average hole is 40 ft deep. It goes through 23 ft of clay, 7 ft of moraine, and 10 ft of rock. Drilling in such areas proceeds at the rate of 15 holes per shift.

Drilling the holes at an angle is helpful in blasting a large number of holes with short delays. The incline causes the blast to throw

rock upwards and sideways in one direction leaving a free rock face for the succeeding blasts.

On the Lindo job the inclined holes offer a secondary advantage. The upward and sideways movement of the blasted material thoroughly mixes the rock, moraine, and clay making it easier to dredge.

## Special Loading Device

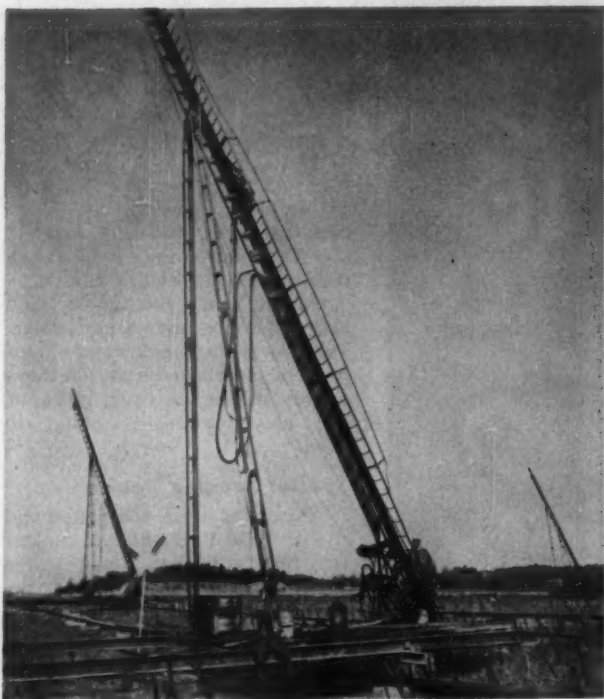
After the hole is completed and the drill steel withdrawn, a plastic tube is pushed down inside the drill pipe. An external packing ring collars the plastic pipe into the rock. The steel pipe is then pulled up because it is too expensive to be expended in the blast.

A Swedish explosives manufacturer, Nitroglycerin AB, devel-



**LINDO DRILL** — The part immediately above drill pipe is mechanism for rotating both pipe and drill steel at same time.

## DREDGES DIG CANAL... continued



**SLANTING HOLES** — Inclined shots, fired with short delays, thoroughly mix the rock with overburden and make the dredging easier.



**AIR GUNS**—Dynamite is loaded in tube through breech opening, compressed air shoots it down the hole. Air pressure is 44 psi.

oped special compressed air apparatus for loading the holes. The device consists of a plastic tube with a breech opening and controls for the compressed air. The breech opening closes automatically when compressed air is applied through a foot-operated valve.

Inside diameter of the loading tube is slightly larger than the 2-in. dynamite cartridges. The tube's diameter decreases slightly at the ejection end. This causes enough pressure to build up to slit the cartridge wrapping.

Normally the hole is filled with explosive only in the rock section. If the overburden is especially thick or hard, it, too, is loaded, but it is not tamped with caps.

During loading, cartridges are pushed in through the breech until they begin to stick. Releasing some of the compressed air eases them down the tube. Then more cartridges are inserted until about 40 or 50 are in the tube.

After the cartridges are loaded, air pressure at 44 psi forces them

into the hole. An up and down movement of the loading tube in the bore hole effectively tamps the charge to the required density.

The priming charges are placed near the bottom of the hole. They consist of 22-mm cartridges of blasting gelatine and two short-delay electric detonators.

First a few ordinary cartridges are loaded and well tamped. Then the loading tube is withdrawn from the hole and a primer inserted in the mouthpiece. Next the tube is pushed back down the hole with the detonator leg wires on the outside.

Extra strong insulation protects the leg wires, and a special outer shell strengthens the blasting caps. Where the rock section is especially deep, primers also are placed in the middle of the bore hole near the bottom.

### A Big Blast

Recently, a 4,750-hole blast was set off. More than 12,000 detonators fired the 123,000 lb of

dynamite. The total quantity of material blasted included 36,000 yd of rock and 90,000 yd of clay and moraine overburden.

The large amount of dynamite insured adequate fragmentation for the subsequent dredging operation. Closer than normal spacing of the holes achieved the necessary concentration of explosive. Hole spacing was about 5 ft instead of the normal 7½ ft.

The close spacing made it hard to prevent a disturbance of the firing sequence by propagation. They solved this by first loading only every other hole with 60% dynamite and placing 50% dynamite in the remainder of the holes. Loading and hooking up the big blast took six weeks.

It took a total of 31 firing intervals. The delays were 12 to 13 milliseconds for the first 20 numbers and ranged from 25 to 100 milliseconds for the remainder. Holes were connected in series of about 45 holes each. The 263 series were hooked up in parallel.

*continued on next page*



P. H. "Bud" Mentzer, equipment supervisor, Fisher Contracting Co., Phoenix, Arizona

## "...using the **FINEST** pays off"

"Our reason for using Union's Guardol and T5X Motor oils in 175 major pieces of equipment is simple—it pays off."

"Over the past 7 years that we've been using these Union oils exclusively, we've found them to be the finest in the field. The fact alone that their detergent reserve has enabled us to extend our fleet's overall oil-change interval 50 hours, more than justifies a slight extra cost over ordinary oils."

Add to this the increased overhaul interval and decreased 'down time' which these detergent reserves in Guardol and T5X insure, and you'll see why more and more of the world's most important contractors are specifying Union lubricants exclusively.

**UNION OIL COMPANY OF CALIFORNIA**



UNION OIL CENTER, LOS ANGELES 17, CALIFORNIA, U. S. A.



## **Thermoid THUNDERBIRD...** **the toughest (*yet most flexible*) air hose you've ever used**

Give Thermoid-Quaker THUNDERBIRD Wire-Braid Hose the works . . . the roughest kind of impact, twisting, crushing, inside pressures. It'll take everything you can deal out, and then some.

THUNDERBIRD takes this punishment while remaining the most flexible, non-kinking air hose you've set eyes upon. Accurately-controlled angle of wire braid assures this



extreme flexibility. Tough neoprene tube resists hot or cold oil. Yellow neoprene cover provides maximum abrasion-resistance and high visibility even in the dark.

Sizes from  $\frac{3}{4}$ " to 4" I.D. Working pressures to 400 psi air or 2,000 psi water. Lengths to 50 feet. Ask your Thermoid distributor about THUNDERBIRD, or write *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Phila. 24, Pa.*

**THERMOID DIVISION**

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**H. K. PORTER COMPANY, INC.**

**PORTER SERVES INDUSTRY:** with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRATORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY DE MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD

## DREDGES DIG CANAL... *continued*

Four twin-wire bus wires of bare copper were hung on posts and ran the length of the blasting area. The wires were connected in parallel by cross leads. The leading wires connecting the system to the blasting machine were about 1,650 ft long. The complete electrical circuit for the big blast comprised about 300 mi of wire.

Another piece of equipment specially constructed for this job is the condenser-discharge type blasting machine. A hand-driven generator supplies the power. At 1,000 volts, the machine's capacity is about 1,000 amp; its maximum output is 1,000 kw.

All circuits and individual blasting caps are tested for resistance. In addition, the leg wires of each cap are tested as soon as it is inserted in the hole. The testing instrument detects galvanic potentials arising from faulty insulation.

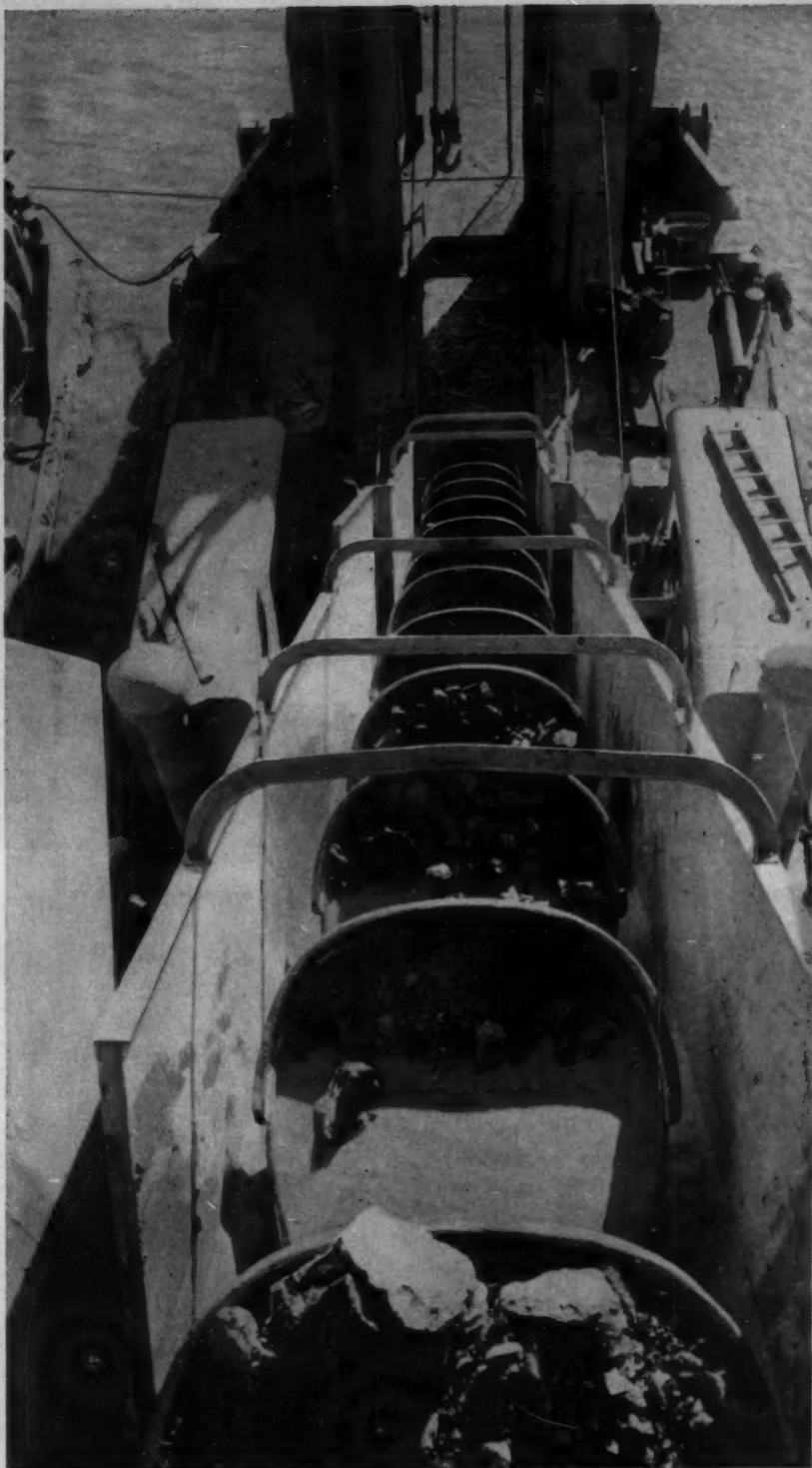
In previous smaller blasts about 120,000 yd of rock had been broken. Dynamite was used at the rate of 20,000 to 45,000 lb per blast. The big 4,750-hole blast broke a 157,000-yd section of rock at the entrance to the canal. All subsequent blasts will be smaller.

### **Special Dredge**

Dredging of the blasted sections is under way with a specially built unit. It was designed for Skanska Cementgjuteriet for dredging in difficult materials. Other dredges are also being used. The new unit is equipped with 0.8-yd buckets, and has a capacity of 600 yd per hr when dredging loose material.

Blasting takes place along the canal as the dredge makes its way forward. This far the fragmentation encountered by the dredge has been satisfactory for troublefree operation.

In addition to dredging the canal, a 2-mi channel extending into the fiord will be deepened. The finished channel will be 31 ft deep and 180 ft wide at the bottom. It will be big enough for two 5,000-ton vessels to pass each other. For one-way traffic it will accommodate tankers up to 16,000 tons dry weight. The Lindo Canal will be slightly larger than the Manchester Ship Canal and the Kiel Canal.



**CANAL DIGGER**—A dredge was specially designed to handle difficult materials. It is equipped with 0.8-yd buckets and has a capacity of 600 yd per hr when dredging loose material. The contractor also has several conventional dredges working on the canal.



After breaking up and truck-loading asphalt pavement, Michigan cut down hump-type island, then rough-graded prior to paving. "I like its versatility, balance, speed, economy," says Owner Carmen Ottilio, . . . "also the fine service I get from my Michigan dealer, Equipment Distributors of Little Ferry, N. J."

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# Strips 2500 yds of asphalt in 8 hours with Michigan 275A Tractor Shovel

*Fast 4-yd unit helps V. Ottilio cut costs 50%*

All over the country, enterprising contractors are finding Michigan Tractor Shovels can effectively handle jobs once considered much too tough for rubber-tired equipment.

Here's a case in point.

V. Ottilio & Sons, Paterson, New Jersey, widening and resurfacing a 2½ mile stretch of U. S. Route 46 near Paterson, used one of their five Michigans, a 262 hp 4 yd Model 275A, to rip up and load old pavement . . . plus handle excavation for the new roadbed.

Pavement handled, mostly asphalt shoulder cover, averaged 4 to 6 inches thick—up to 9 inches in some places—weighed about 3200 lbs per cubic yard. Ottilio found the big Michigan, working alone, handled the job 50% cheaper than could a combination of machines.

## Michigan replaces swing shovel, crawlers

Before the Michigan started work, Ottilio tried a 1¼ yd swing shovel and a pair of crawler pushers. Production was good, but not good enough. So, for more loading capacity, in came the 4 yd Michigan. It worked so well, the other rigs were taken off the job. Then, contractors thought they'd speed things still further by adding a 45,000-lb-class crawler. This move proved unnecessary! The increase was so small the crawler was retired and the Michigan did the entire job!

## Versatile unit handles topsoil, old pavement, rough-grading

First, the 28 mph Tractor Shovel placed barricades and flashing-light stanchions. Then it stripped and truck-loaded top soil. Next, it broke out and loaded old

pavement. Next came excavation and loading out of all dirt in the center island. Last, the Michigan rough-graded sub-base to 12 inches below existing grade. (The old road was a four-lane divided structure with 10 ft inside asphalt shoulder strip and hump-type grassed center island 28 ft wide. The new road will have two new inside third lanes, with bituminous concrete shoulders and a narrow depressed center isle). Stripping and loading production ran as high as 3,000 bank yards in 8 hours. It averaged 2,500 yards a day—compared to 1,500 yards the old way. And costs on the \$380,000 contract, with one machine stripping and loading instead of two or three, were down "over 50%."

## Keeps 15 big trucks busy

This boost in production—and cut in costs—under the considerations of the restricted work area—was one of the biggest surprises of the job, according to Carmen Ottilio, company president. Michigan's high speed and maneuverability were responsible. The 4 yd Tractor Shovel kept a fleet of 15 trucks busy (on a 2 mile haul). It loaded each of the 14 yd haulers with three bucketfuls in about a minute.

## Make your own test

Like Ottilio & Sons, many other Michigan owners are finding this Tractor Shovel actually will improve production on jobs which have never before been tried on rubber. The complete power train—torque converter, power-shift transmission, planetary axles—was designed and built by Clark, specifically engineered to give Michigans more usable power and traction than you've ever seen on rubber. For proof, ask your Michigan Distributor to demonstrate. You name the job!



Despite narrow work area between open traffic lanes, maneuverable Michigan digs, turns and dumps so fast it loads 14-yd trucks in average of 1 minute. Unit has 4 yd bucket, lifts 22,000 lbs, can make non-stop U-turn in radius of 27'5".

Michigan is a registered trademark of  
**CLARK EQUIPMENT COMPANY**  
Construction Machinery Division



2403 Pipestone Road  
Benton Harbor 31, Michigan

In Canada:  
Canadian Clark, Ltd.  
St. Thomas, Ontario



On Wright Contracting Company job in Maryland, this 375 hp, 74,000 lb Michigan Model 380 Tractor Dozer push-loads pan to 23 pay yd spill-point in under a minute.



Keeping up with three to five haul units, the one 262 hp, 56,000 lb Michigan Model 280 spreads rocky clay and broken shale. Job used to require two crawlers.



Despite heavy fill requirements, Wright's Model 280 finds time to maintain haul road, clean embankments, do other jobs to keep operation running smoothly.


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\* *Michigan pusher:*  
30 EXTRA LOADS PER SHIFT

\* *Michigan fill-dozers:*  
REPLACES 2 CRAWLERS

\* **PRODUCTION  
UP 17%  
IN  
ROCKY CLAY**

By switching from crawlers to two different Michigan Tractor Dozers, Wright Contracting Company, Columbus, Georgia, has put speed into two of their most important job functions—push-loading and spreading fill. The result is two-fold—greater scraper output and a reduction in fill-dozers requirements from two machines (one full-time, one part-time) to one (part-time).

These savings first became apparent last spring.

The Wright Company had just landed a big Interstate contract and to better their profit picture had decided to invest in a couple of new dozers. A company committee, headed by R. H. Wright, Jr, company president, started looking around. Soon, they got interested in the Michigan Line. As Mr. Wright put it, "There was no question of the advantages rubber tires *could* give us in reduced maintenance and greater speed. But we did wonder how the Michigan could produce."

So, they asked Washington D.C. distributor, Paving Supply & Equipment Co, for an on-the-job demonstration. Two Michigan models were selected—the 262 hp Model 280 and the 375 hp Model 380. (Wright, incidentally, could have gone bigger, to the 600 hp Michigan

*Model 480—or smaller, to the 162 hp Model 180 . . . but, with Michigan's full line, he was able to choose the power and weight best matched to his job.)* When Wright Company officials saw what these units could do, they bought 'em.

**Pusher loads 6,000 pay yds per 10-hour shift**

Today, both Michigan Tractor Dozers are on the Interstate job—a 4.7 mile, 1,400,000 yd section of U.S. 70 near Hagerstown, Maryland. The 375 hp Model 380 has been assigned push-loading—regularly handling three twin-engine, *side-boarded* scrapers in the clay section of the job. Its production has been exceptional—working in the high-void heavy rocky clay, it has needed only 40 to 55 seconds to heap the big pans. Loads average 23 pay yards. (This compares with 70 to 85 seconds, 22 pay yards, obtained with a 320 hp crawler-pusher formerly used in this material.) Greater Michigan speed and power through torque converter accounts for the small, but important difference. Fast backup and positioning help cut cycle time too . . . the net result being an average scraper output of 6,000 pay yards per 10-hour shift . . . 17% more than with crawler-pushing. Hauls average

1,000 to 1,500 ft one-way, scraper cycles 6 minutes.

**Dozer spreads 6,000 yds per 10-hour shift, also does odd jobs**

Meanwhile, the 262 hp Michigan Model 280 is being used on the fill. It has replaced two big crawlers here (one full-time, one part-time)—has no trouble precision-spreading all the material delivered by the three big scrapers plus several auxiliary units. In addition, the Michigan Model 280, with its go-anywhere 28 mph mobility, has had time to travel *off the fill*—keep haul roads in shape, clean embankments, perform emergency tasks.

With a Michigan Tractor Dozer or two, we honestly think *you can get similar results*. Why not at least see? Pick one or more Tractor Dozer models . . . then call your Michigan Distributor for a demonstration. The test will cost you nothing . . . and it *may* put thousands of dollars in your pocket.

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## 100 year old contracting firm—and their formula for profits

Every contractor, at one time or another, has to make a basic decision. Should he invest in a lot of equipment and go after one or two big jobs a season? Or should he keep a relatively small fleet busy on lots of little jobs? A. J. Raisch Paving Co of San Jose, California, herewith tells why they've operated on the small-job theory *ever since 1853!* Pat Regan, Executive Vice-President, and A. G. Raisch Jr, Vice-President and grandson of the company's founder, talking...

Why do we continue in the small-yardage business? Well, it's not because of a shortage in big contracts. California's got expressways and bridges going up all over. There's plenty of money to be made. But plenty of risk and headaches, too.

At the same time, never have there been so many small-yardage jobs. The Bay area is booming! There are hundreds of new streets to be cut and paved. Thousands of home sites to be leveled.

Businesses to be re-located. Plenty of money here too. With less risk. Less investment. *And*, today, equipment ideally suited to scattered work.

**Michigan Scraper-Dozer fleet provides ideal mobility, output**

I'm speaking of The Michigan Line. You can get matched Dozers, Scrapers, and Tractor Shovels in any size range you want. *You don't need ANY crawlers or trailers or haul-type equipment.* We have a

262 hp Model 280 Michigan Tractor Dozer and two 19-yd Model 210 Michigan Tractor Scrapers. They and a pickup truck comprise our dirtmoving fleet. We road them everywhere. They have speed—close to 30 mph on the highway. And, boy, do they make the dirt fly!

The two Scrapers, push-loaded by the Dozer, move about 6,000 yards a day. Their speed on the job—and between jobs—lets us do typical subdivision contracts as fast as two a day. In the last two months, for instance, we completed 37 of them, 1,000 to 50,000 cubic yards each. This included cutting sidewalks, road grade and gutter lines, plus finish-grading to within an inch or two—which saved important time for our paving crew.

**Callbacks no longer a problem**

Another place the Michigans help save time is on callbacks. Previously, with crawlers, callbacks cost us more in travel



Combination of Michigan push, Michigan pan picks up 16 pay yds in 30 to 40 seconds. Demonstration put on by local Michigan distributor, Buran Equipment Co, showed this combination produced 10% faster cycles, 3½ pay yds more than crawler-pusher and 6-wheel-design 18-yd scraper. Result: contractor wouldn't let Buran take Michigans off the job, used demonstrators until his own Michigans (shown) arrived.



Operator Bob Davis finds combination of torque converter, power-shift transmission, and power-tilt power-pivot blade ideal for fine-grading. "Driving through traffic is as easy as in my car," he adds.

Time-saving in action. Foreman Martin Cheo receives orders by phone, gives them to Michigan operators. Then, soon as job is complete, entire fleet speeds under own power to next site.



expenses than we could charge for all the new dirt. Now, though, if we're asked to return to a job, it's no problem. Our complete fleet is on the site in no time. A typical move, 8.6 miles through city traffic, takes about 40 minutes.

When a separate rush job comes up,

we're ready too. For example, a local subdivider wanted 30,000 yds leveled in a hurry. An hour after our bid was accepted our three Michigans had driven across town and were moving dirt. Another time, we stripped and stockpiled 1,500 yds of black dirt in 2 hours.



To save time, high-powered Michigan Tractor Scrapers generally self-load first 7 or 8 pay yds, get pusher assist for heap. This and other photos were taken on 1100 home Seven Trees subdivision near San Jose, Calif.

#### Michigan buyers since 1954

Are we satisfied? Well, we bought our first Michigan (an excavator crane) in 1954 . . . and we're still buying 'em.

*See the Michigan Line for yourself. There's a Dozer-Scraper "fleet" to fit your needs . . . 162 hp-10½ yds, 262 hp-19 yds, 375 hp-29 yds. Tractor Shovels in similar sizes too. Each machine uses same basic power train, tires, hydraulics, etc as others in its size range . . . thus you get greater efficiency, need fewer parts. We'll be glad to give you a "no-obligation" demonstration—at your convenience!*

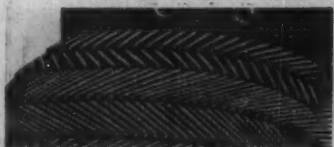
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(STEEL CABLE)



(DOUBLE-STRENGTH NYLON)

# NOW! DOUBLE-ARMORED PROTECTION ENDS COSTLY TIRE REPAIRS!



New U.S. Royal Super Fleetmaster gives unmatched Stamina for Speed on the highway... Brute Strength for off-road impacts!

Now you can travel improved roads at full highway speeds, yet have two-way protection against heavy impacts and cutting in off-road service!

Exclusive "U.S." **Safety Steel Shield** puts two layers of tool-hard steel cables between the tread and cord body—forms an impregnable barrier against ruptures, cutting or penetration. Provides permanent protection during life of original tread

and all retreads. **Double-Strength Nylon**... twice as strong as the nylon cord used in ordinary heavy-service tires gives utmost protection against impact breaks and blowouts that result in on-the-job delays.

See it for yourself... call your U.S. Royal Dealer today and test a set of these new U.S. Royal Super Fleetmasters—Nylon and Safety Steel Shield.

## U.S. ROYAL TRUCK TIRES



**United States Rubber**

# Midget Mill Turns Out Tubing



*A midget compared to 40 or 50-ft-long standard tube mills, this diminutive model, measuring only 6x8 ft at the base, uses a high frequency welding process to turn strip metal into tubes. Contractors may use the mill to make drainage pipe, tubular piles.*

IT SOUNDS FAR-FETCHED, but contractors soon may be able to produce spiral-welded pipe on the job site. A newly developed portable mill that winds strip metal into a tube and forge welds the seam will make this possible.

Most amazing thing about the mill is its small size. Only 6x8 ft at the base, it can be mounted readily on a trailer. In comparison, standard tube mills are about 50 ft long.

Here's how the mill works. A coil of strip metal spindled on a stand enters the mill at a pre-set angle that determines the number of spirals per foot. A motor-driven mechanism draws the strip into the mill, feeds it through a cylindrical mandrel that twists it into a tube of the desired diameter, and delivers the spiral to the welding head.

At the welding head, the edges of the twisted strip form an elongated V. The weld occurs at the root of the V. Two sliding contacts, one on either side of the seam, introduce high-frequency current that heats the metal to fusion temperature.

Developed by New Rochelle Tool Co., New Rochelle, N. Y., and called Thermatool, the welding unit operates at a frequency of 450,000 cycles per sec. This high frequency is what puts the unit in a special class.

At such high frequencies, electrical current does strange things. It just skims the surface of an electrical conductor, instead of running inside it. Ignoring the path of least resistance, it goes the long way around, following the path of lowest inductance.

What actually happens at the

**SIMPLE AND VERSATILE**—One man easily handles operation of the mill. Simple adjustments change the diameter of the tube and the number of spirals per running foot. The mill welds just about any metal you feed it.

welding head? The two sliding contacts ride along the seam about 2 in. from the root of the V. Instead of arcing across the small gap between the contacts, the hopped-up current hugs opposite sides of the seam, running down each edge to the root of the V. There the high-intensity current heats the metal to fusion temperature. Pressure applied at the root fuses the edges of the coiled strip together.

The mill is extremely versatile. A switch in just one part—the cylindrical mandrel that winds strip into tube—changes the diameter of the tube. The switch takes only a few minutes.

A simple adjustment changes the angle of entry of the strip, controlling the number of spiral  
*continued on page 128*



**FAST, TOO**—The tiny mill squirts out 3-in. tinplate tubing at a rate of 150 ft per min.



**PROJECT PAYDIRT\*** *pays off again...*

# NEW CAT D7 SERIES D



**\*PROJECT PAYDIRT:** Caterpillar's multimillion-dollar research and development program to meet the continuous challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

# TRACTOR

## THE PAYOFF FOR YOU: MORE PRODUCTION AT LOWER OPERATING COST THAN EVER BEFORE!

By any comparison the new Cat D7 Series D Tractor is champ in its class. It packs 140 horsepower... matched with 80% more lugging ability than the previous model for greater production. And it delivers this production with lower operating and maintenance costs. The payoff is increased money-making performance *on your job*—performance that no other tractor in its power range can match!

Major improvements, developed by Caterpillar's Project Paydirt, account for the increased capacity of the new D7. These improvements affect the engine, power train and undercarriage. They're explained in detail on the right.

Along with the new features, the best of the time-tested features of the Series C model have been retained. One of many examples: the exclusive Caterpillar oil clutch, which delivers up to 2,000 hours—one whole season—without adjustment!

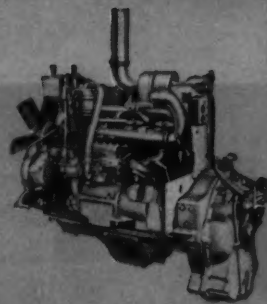
For complete facts about the leader in this class, see your Caterpillar Dealer. He's ready to give you the whole story about the new D7 Series D, as well as other achievements of Project Paydirt. He'll be glad to demonstrate, too, for this D7 really shines—in action. Say when and where—he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

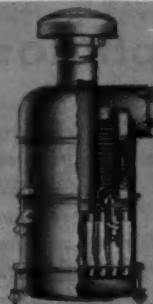
# CATERPILLAR

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**BORN OF RESEARCH  
PROVED IN THE FIELD**



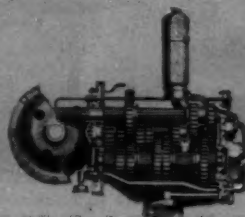
**NEW TURBOCHARGED ENGINE.** 140 flywheel horsepower... 112 drawbar horsepower make the new D7 even more productive. In-seat starting is available as an attachment. And in addition to the 9% horsepower increase, the new Turbocharged Cat Engine offers 80% more tractor lugging ability. The payoff: greater capacity to lug against big loads without stalling—for higher production, greater operating economy.



**NEW DRY-TYPE AIR CLEANER.** Pioneered by Caterpillar, this new dry-type air cleaner uses cyclone tubes and cellulose filter element to remove at least 99.8% of all dirt and dust from engine intake air—during every operating hour, even under the most severe operating conditions. Filter element can be cleaned and re-used. Cleaner can be serviced in 5 minutes. The payoff: longer engine life, greater economy, less maintenance.



**SERVICE-FREE TRACK ROLLERS.** New lifetime lubricated track rollers, carrier rollers and idlers on the undercarriage are protected by exclusive Caterpillar floating-ring seals. They need no lubrication until rebuilding, eliminate on-the-job roller lubrication. In addition, track roller life is increased by improved load-carrying design. The payoff: greater economy, longer life, less maintenance.



**PRESSURE-LUBRICATED TRANSMISSION.** Transmission, bevel gear and pinion are now pressure lubricated with full-flow filtered oil, another development of Caterpillar's research program Project Paydirt. And new power train components, provided to transmit greater horsepower, feature a major increase in strength in the final drive gears. The payoff: longer lived gears and bearings for trouble-free operation.

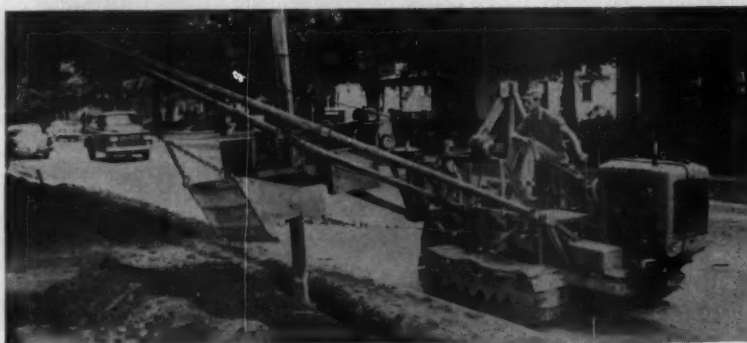


## Job photos don't lie . . .

*See from these photos how the Cleveland 80W's ability to pull backfill into trench permitted spoil to be placed off the street, away from the curb—no blocked-up catch basins, no need to lift backfill over curb, no interference with traffic (good public relations!). Note also how the one-man-operated 80W first backfilled and tamped driveways, making them ready for immediate use (more good public relations!) then backfilled and tamped the rest of the trench.*

## but they tell only part of the CLEVELAND 80W story

But you've got to see the 80W in action to really appreciate it—a cost-cutting versatile machine that fits so many different underground construction jobs. It handles and lays pipe—sets valves and hydrants—pulls street crossings—backfills fast *from either side* of trench, toward or away from itself—simultaneously tamps fill to the most rigid specifications—does a complete clean-up job.



**The CLEVELAND TRENCHER Co.**

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO



## MIDGET MILL . . . continued

seams per running foot of tube. Tighter spacing of seams increases the stiffness of the tube.

The mill welds just about any metal you can feed it—copper, brass, aluminum, or steel—with equal ease. It handles strips varying in thickness from 0.004 in. to  $\frac{3}{8}$  in. A lap, mashed lap, or butt-edge seam may be welded, as desired.

And it's fast. The small model shown in the pictures on page 125 squirts out 3 in. tinplate tubing at a rate of 150 ft per min. With more power it could double that rate. The high speed of the unit makes up for the round-about course of the spiral weld, which is several times longer than a straight seam down the center of the tube.

Operation is simple; two men can handle it. Down time during change overs is only a matter of minutes. And maintenance cost is low: worn welding contacts (they have a life of about 100,000 ft of weld) can be replaced in 5 or 6 min.

### Three Models on Market

New Rochelle Tool have produced three small models of the mill. Size of the tubing they turn out ranges from 1½ in. up to about 12½ in. New Rochelle Tool will either sell these models or lease them to a user.

For larger units turning out tubing up to 6 ft or more in diameter, they will furnish the high-frequency welding equipment for any forming mill that is compatible with the Thermatool process. So far they have supplied welding equipment for several pipe manufacturers.

Contractors are showing interest in the mill. A major foundation contractor plans to use the patented process to make tubular piles. Big advantage in this field is that lighter metal can be used because the spiral seam stiffens the tube.

There is a good chance that contractors may use the mills for in-the-field service. A diesel engine and generator mounted with the mill on a trailer makes a compact, mobile unit that can turn out tubular piles, drainage pipe, or conduits on the job site. Big savings in transportation costs are possible because one truckload of strip metal is equivalent to several truckloads of tubing.



## SYMONS® CONE CRUSHER AIDS WATER DIVERSION PROJECT



### ... produces over 100,000 tons of granite gravel with original crushing members

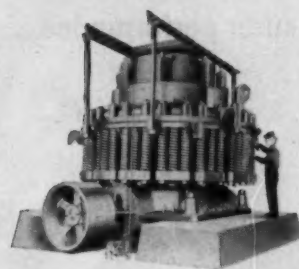
Shown "on location" in scenic Colorado, this 3-ft. Symons Standard Cone Crusher is doing an outstanding job of producing aggregate for a 23-mile long tunnel to divert some 500 million gpd of western slope water out of the Blue River to the eastern slope of the Continental Divide.

Operated by Blue River Constructors, in a crushing plant designed by Brown and Root, Inc. of Houston, this sturdy crusher has produced more than 100,000 tons of tough granite gravel, with the original crushing members.

This is another good example of the dependable performance that contractors and producers have learned to expect from Symons Cone Crushers, in both stationary and portable service.

*Write for literature.*

**NORDBERG MFG. CO., Milwaukee 1, Wisconsin**



#### SYMONS® CONE CRUSHERS

... The machines that revolutionized crushing practice ... are built in a wide range of sizes, for capacities to over 900 tons per hour. Write for descriptive literature.



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SYMONS ... a registered Nordberg trademark known throughout the world

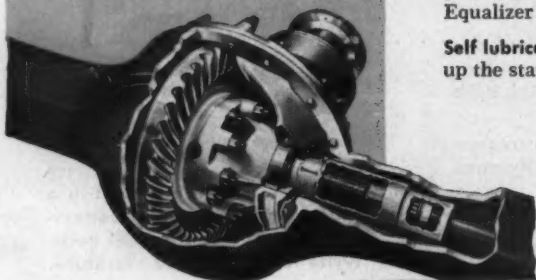
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SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

# NEW ROCKWELL TRACTION EQUALIZER...

puts the  
action  
where there's  
traction!



Available  
with  
**Timken-Detroit Axles**  
for safer,  
surer performance...  
on or off  
the highway!



*Another Product of...*

**ROCKWELL-STANDARD**  
CORPORATION



Timken-Detroit Axle Co. of Canada, Ltd., Windsor, Ontario

**Applies driving force to wheels with best traction.** The Rockwell Traction Equalizer provides a substantial increase in tractive effort to the wheel with the best road adhesion. It is effective on a vehicle even if one pair of the driving wheels has no traction!

**Safer, surer operation.** A truck equipped with the Rockwell Traction Equalizer is easier to control on curves, slippery pavement and soft ground. The tendency of a vehicle to swerve when one wheel suddenly loses traction is eliminated because wheel spinning is reduced.

**Constant actuation.** The Rockwell Traction Equalizer doesn't depend on the driver to start it working. It is effective whenever one wheel has the tendency to turn faster than the other.

**Tailored for effectiveness.** With multi-drive axle vehicles, each axle may be equipped with Traction Equalizer units. No matter where your vehicles operate—on or off the highway—the Rockwell Traction Equalizer gives your vehicles better traction.

**Self lubricating.** The Rockwell Traction Equalizer automatically picks up the standard axle lubricant and works it through the unit.

**Less maintenance.** The Rockwell Traction Equalizer normally requires no maintenance between axle overhaul periods. It also cushions heavy impact loads upon tires, shafts and gears.



**MONITORING**—Geologist moves seismograph along concrete dam during blasting.

**BLASTING** a 3-mi sewer trench through granite and basalt calls for extra precautions when the ditch line borders a 42-year-old concrete dam.

M. J. Baxter, El Cajon, Calif., contractor, had to agree to two conditions to safeguard Lake Murray Dam at San Diego against cracking. They had to monitor each blast with a seismograph. And they had to dig out a 200-ft section of the trench within 100 ft of the dam with hand tools.

The seismograph provided double-duty protection. It permitted close control of the blasting by measuring the magnitude of the vibrations. And it gave the contractor, the city, and the irrigation district an accurate blasting record to refute possible property damage claims.

Blasting crews inserted 20 to 30-lb charges in drill patterns  $2\frac{1}{2}$  to 4 ft apart. Then they fired delay electric blasting caps, 12 to a single-wire lead, at 25-millisecond intervals.

During the blasting, J. E. Goffman, geologist for Baxter moved a Sprengnether seismograph along the top of the dam to various critical points. Only once did the vibrations approach a danger point, based upon the tremor required to crack plaster—not concrete. The dam was not damaged.

The seismograph magnified vibrations 50 times and recorded them on a drum. It recorded three horizontal lines on a drum during the periods of inactivity. But waves appeared in one or more of the three lines whenever there was a disturbance.

*continued on next page*

## Curbs on Blasting Safeguard Old Dam

This contractor monitors each blast with a seismograph and relies heavily on hand labor to protect dam against cracking.



**HAND LABOR**—Workmen dig with hand tools to excavate 12-ft trench through solid basalt and granite for sewer line alongside concrete dam. Officials prohibit blasting here.



**CRACKING ROCK**—Workmen put Duncan hydraulic Roc-Jac into 12-ft holes bored by pneumatic drilling rig. Hand-operated jack is basic tool for breaking section of rock face.

## CURBS ON BLASTING...

*continued*

**DRILLING**—Ingersoll-Rand crawler rig bores 12-ft holes on 10-in. centers for hydraulic jacks. It took eight weeks to cut 200-ft-long trench with hand labor in section alongside dam.

Goffman computed total disturbance by measuring displacements above or below the horizontal. An oscillator, which



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.... becomes evident after sufficient exposure to the original cost/maintenance costs/production/profits equation.

Exploiting the full potential of better basic design, the Miller Gold Star 300 series ac-dc welders convert in minutes from the prime ac-dc welder of exceptional performance to any of these three A-C applications: Metallic Arc, manual or automatic Inert Gas; or, to any of the following D-C applications: Metallic Arc, manual or automatic Inert Gas, or Inert Gas spot welding.

It's important to note that the Miller conversion kits utilized to obtain any of the above simply extend the built-in superiority of the 300 series' welding characteristics into the type of application desired. It's adaptable by design — not discovery.

Available in 200, 300, 400 and 600 ampere models, all feature the exclusive Miller transformers and semi-metallic rectifiers. Complete specifications, including duty cycle chart, will be sent promptly upon request.

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ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co. Ltd., Montreal

produced vertical lines 0.02 sec apart, made it possible to measure the duration and frequency of the vibrations as well as their magnitude.

The instrument, the size of small suitcase, was sensitive enough to pick up vibrations from the drilling equipment. Baxter relied on the seismograph every day during the two-month construction period for all blasting within 1,000 ft of the dam.

### Hand Work

It took two contractors eight weeks of arduous labor, much of it by hand, to dig the 200 ft of trench in the area where blasting was prohibited. Tavares Construction Co., San Diego, and Baxter pooled men and equipment.

Six men, operating hydraulic jacks and pneumatic drills, completed this section of the ditch to a maximum depth of 13 ft. They used Thor and Ingersoll-Rand pneumatic drills, four Duncan Roc-Jaks, an I-R crawler drill, two Gardner-Denver Air Tracs, and two G-D compressors.

Workmen drilled holes 12 ft deep into the rock on about 10-in. centers. Next, they inserted hydraulic jacks into the holes to break out the rock face.

The average depth for the trench was 6 ft, except for the portion by the dam which was 12 ft.

The sewer line will serve an 8,000-home community that Tavares is building. The only feasible route for the line lay between the dam and a hill. They built an access road along the 3 mi length to bring in construction machinery.

Bob Stewart, Tavares superintendent, said the line took twice as long and cost twice as much to construct because of the proximity of the dam.

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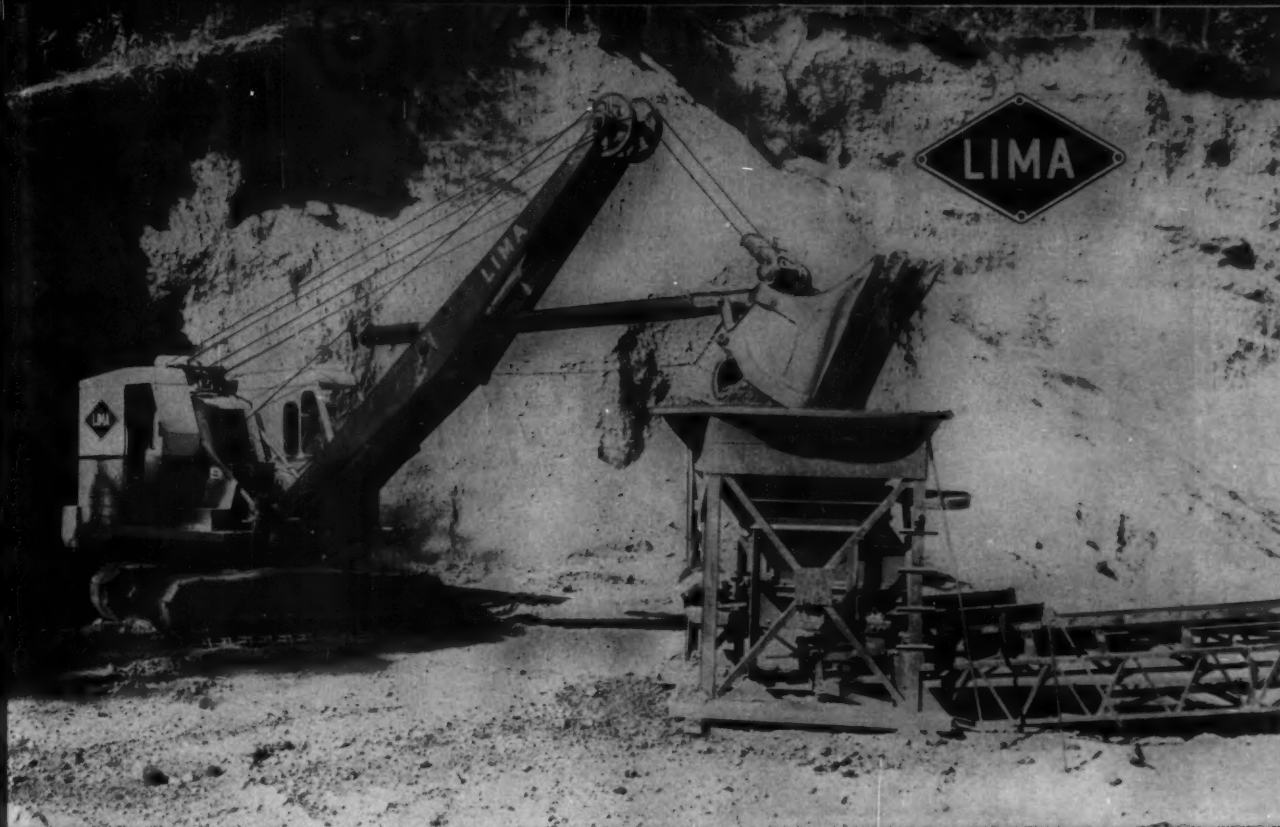
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Crawler-mounted Lima Type 44 1-cu. yd. shovel loads sand and gravel into automatic feeder of Lima Austin-Western 101-SE Crushing and Screening Plant.

## High output LIMA 44 shovel daily feeds over 1000 yards to portable crusher

"It takes a lot of digging to keep pace with a crusher plant that chews up over 1000 cu. yd. of gravel and rock daily," says John G. Yerington, Benton Harbor, Mich., contractor.

### Lima works hard

"We get a lot of work out of our Lima 44 shovel. It works hard under rugged conditions, yet maintenance is low and we've had very little downtime with it.

"It has the built-in quality features you expect of Baldwin-Lima-Hamilton equipment. Besides the Lima 44, I have five Lima Austin-Western crushing and screening plants, plus three Austin-Western graders, five A-W rollers and an A-W hydraulic crane."

The Type 44 can be used inter-

changeably as a 1-yd. shovel, 25-ton crane, dragline or pullshovel. Available with crawler, truck or wagon mounts. Gas or diesel engine—torque converter is optional. Boom assembly or disassembly extra easy with pin or butt connections. Low gravity center. Large free-acting clutches—easy to operate and adjust.

### Minimum Maintenance

Type 44, like all Limas, is designed and quality built to outperform with minimum maintenance requirements. Let a Lima tackle your toughest job. There's a type and size just right for your needs. Cranes to 110 tons, shovels ½ to 6 cu. yd., draglines variable.

Contractors everywhere are sold on

Limas. Find out why! See your nearest Lima distributor or write to us now. You'll profit with Lima!



Lima Austin-Western portable 101-SE Crushing and Screening Plant teams with Lima Type 44 shovel for high daily production.

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**LIMA** Construction Equipment Division, Lima, Ohio  
**BALDWIN · LIMA · HAMILTON**

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



596



Morrison-Knudsen Company, Inc., employs M-R-S Model 250 Tractors and Model 250 HW 40 cu. yd., struck—50 yd. heaped—Scrapers on this dam project in Leesburg, Ala. Morrison-Knudsen recently purchased 4 of the R-1550 ROADRANGER-equipped M-R-S Tractor-Scrapers and a 5th Model 250 Tractor used primarily for powering compaction rollers—the company's 3rd purchase of M-R-S 250 combinations in a year. The recent purchase brings the total for the Leesburg job to eight M-R-S 250 Scraper combinations and two M-R-S 250 Compaction Tractors.

Geared by **FULLER** . . .

## 50 YARDS, heaped, with R-1550 ROADRANGER

This M-R-S Model 250 Tractor employs a 600 hp diesel engine and a semi-automatic 9-speed Fuller R-1550 ROADRANGER Transmission to pull an M-R-S 250 HW Scraper with a heaped capacity of 50 cubic yards.

Standard equipment on the huge tractor, the R-1550 ROADRANGER features nine forward and two re-

verse speeds, selected with a single shift lever. With short, even steps—averaging 38%—between forward ratios, the engine can work in the peak hp range at all times, resulting in fast, economical scraper operation.

The Fuller Air-Powered Counter-shaft Inertia Brake on the R-1550 ROADRANGER permits quick, easy up

shifts without double clutching, and the Fuller Pressure Filtration and Lubrication System provides positive lubrication, maintains clean gear oil and prolongs gear and bearing life.

For faster work cycles, lower fuel consumption, longer engine life, less operator fatigue, GREATER PROFITS . . . specify Fuller Transmissions.

# FULLER

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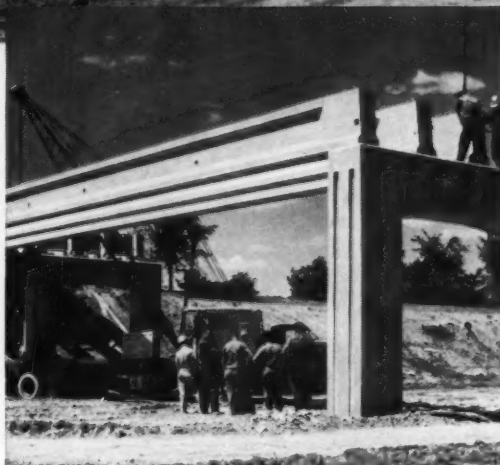
Subsidiary EATON Manufacturing Company



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Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

# PRESTRESSED CONCRETE BEAMS

## for Minnesota Highway Bridge at Fort Snelling



Two cranes place prestressed concrete beams for this new bridge on State Route No. 5, Fort Snelling, Minnesota. Fourteen 78' 8" and fourteen 34' 3" beams were used. The larger units weighed 24 tons each.

**OWNER:** Minnesota Highway Department

**CONSULTING ENGINEERS:** Mayeron Engineering Company, Minneapolis, Minn.

**GENERAL CONTRACTOR:** Ashbach Construction Company, St. Paul, Minn.

**CONTRACTOR FOR CONSTRUCTION OF BRIDGE:** Sheehy Construction Company, St. Paul, Minn.

**MANUFACTURER OF PRESTRESSED BEAMS:** Prestressed Concrete, Inc., Roseville, Minn.

In Minnesota, as in every other section of the country, more and more highway bridges are being built with prestressed concrete beams. Low first cost, quick delivery, ease and speed of erection and minimum maintenance costs are the reasons for the increasing number of bridges of prestressed design.

Beams for this Minnesota Highway Bridge on State Route No. 5 at Fort Snelling were manufactured by Prestressed Concrete Inc., Roseville, Minn. Using Lehigh Early Strength Cement and steam curing, the concrete in these beams reached 5,000 PSI in 12 hours. As a result, the manufacturer gained

maximum production efficiency and economy through early removal of units and quick reuse of casting beds.

This is typical of the advantages of prestressed concrete and Lehigh Early Strength Cement in modern concrete construction.

## LEHIGH CEMENTS

LEHIGH PORTLAND CEMENT COMPANY, ALLENTOWN, PA.



## "Jet age" contractor completes 3700-ft. runway extension on **GULF MAKES THINGS**

Racing against time and plagued by heavy summer rains, A. Tomasso, Inc. of New Britain, Connecticut, became one of the earliest contractors to feel the competitive impact of the commercial jet age.

Tomasso won the contract to extend the main runway at Hartford's Bradley Field, where the old 6000-ft. runway was too short for commercial and military jet aircraft. The contract called for earth-moving, compacting, base-laying and paving . . . for a 2700-ft. primary extension of the runway, plus a 1000-ft. over-run for emergencies. Earth-moving added up to more than 1,000,000 cubic yards. Last July, in spite of unusually wet weather in the summers of 1958 and 1959, they finished on time

—plenty of proof that Gulf makes things run better. Let

Clean-burning Gulf diesel fuel powered all their equipment. heavy equipment, including three new Euclid TS24 scrapers, two Allis-Chalmers 21 bulldozers, a D-8 and a D-9 "Cat," and a "Cat" 12 grader. Louis D. Gronowski, your n Gulf Master Mechanic for A. Tomasso, Inc., reports: "Our maintenance problems were reduced by the clean-burning qualities of Gulf diesel fuel. Our equipment kept working—around the clock—with very few mechanical delays, and the engines stayed unusually clean." GULF Dept. D

And Angelo Tomasso, President, says: "We've never in our history had to pay a penny in damages for being behind schedule. We're not going to start now." William Britain, contractor



...ion on time, in spite of excessive rain . . .

# SRUN BETTER!

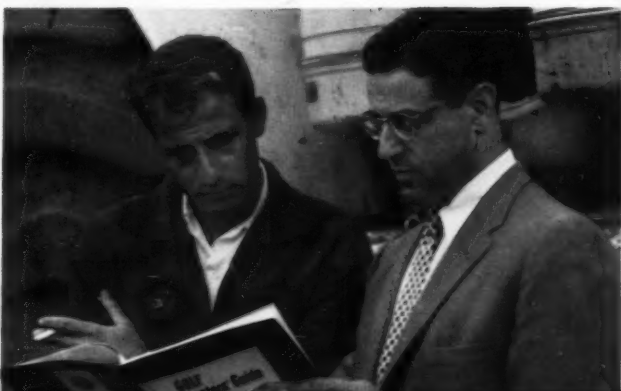
better. Let Gulf supply the fuels and lubricants for *your* equipment, and you'll see how Gulf makes things run better. Just call the Gulf Sales Engineer at 8 and 4000, or write for 88-page nowski, "Gulf Contractors' Guide," the maintenance manual for heavy equipment.

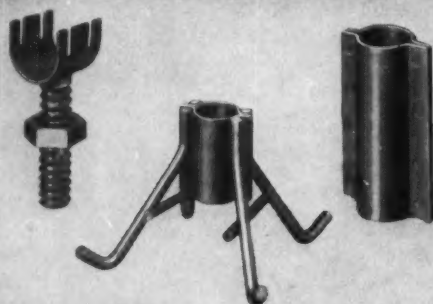
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GULF OIL CORPORATION  
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.



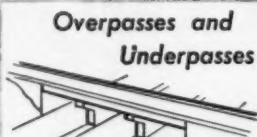
e never  
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" William Tomasso, left, on-site Supervisor for A. Tomasso, Inc., of New Britain, Connecticut, checks heavy equipment maintenance in "Gulf Contractors' Guide" with Lee Douglas, Gulf Sales Engineer.

SP 9842





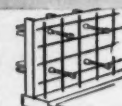
**HEAVY-DUTY  
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SUPPORTS**



*Overpasses and  
Underpasses*



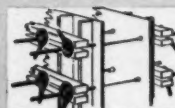
**THREADED COIL TIES**



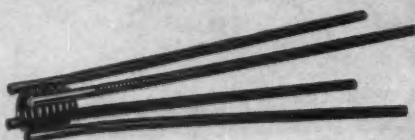
*Engineering  
Structures*



**TILT LOCK CLAMPS**



*Heavy-Duty  
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**4-STRUT  
COIL ROD  
ANCHORS**



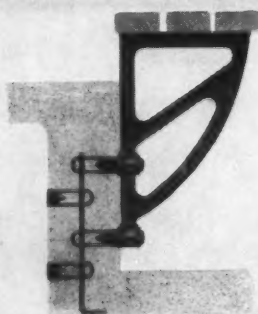
*Temporary  
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Anchorage*



**PLATE  
HANGER  
FRAMES**



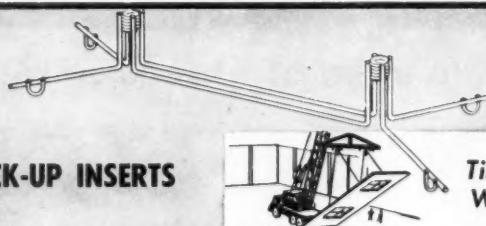
*Bridge  
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**RISER-  
FRAMES**



*Stadiums  
and  
Grandstands*



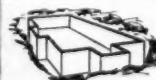
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For Dependable Concrete Forming*

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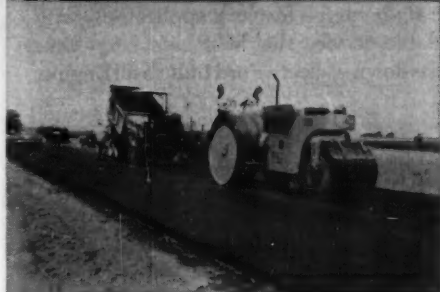
Pacific Coast Plant  
2100 Williams St.  
San Leandro, Calif.

# Illinois modernizes U.S.-36 with Asphalt

## Contractor

McMahon-Illinois Corp. and  
Parro Construction Co., Ur-  
bana, Ill.

Constructing a heavy-duty pave-  
ment of Plant-mixed Texaco  
Asphaltic Concrete on 17 miles  
of U. S. Route 36 near Tuscola,  
Ill. New pavement, shown at  
right, was laid in four courses.



When Illinois modernized the worn, narrow concrete pavement on 17 miles of U. S. Route 36, the project had one unusual feature—the thickness of the new Plant-Mixed Texaco Asphaltic Concrete pavement.

Last year, after the old pavement had been undersealed with asphalt, it was covered by two courses of Texaco Asphaltic Concrete, a 1-inch leveling course and a 2-inch surface.

In 1959, when the pavement was widened, two more layers of Texaco Asphaltic Concrete were added, each 1½-inches thick. As a result, this section of U.S.-36 now has a heavy-duty 6-inch asphalt pavement capable of withstanding the weight and impact of modern truck traffic year after year with a minimum of upkeep.

Whether you are interested in a heavy-duty asphalt pavement such as Plant-Mixed Asphaltic Concrete, or one of the low-cost types of asphalt surfacing, helpful information on all of them is available in two free Texaco brochures. Copies can be secured without obligation by writing our nearest office.

TEXACO INC., Asphalt Sales Div., 135 E. 42nd Street, New York City 17

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# TEXACO ASPHALT

# Whatever your job...wherever you are...



## *You'll find* **FORD INDUSTRIAL ENGINE** **SERVICE *nearby!***

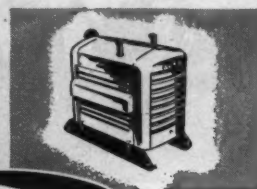
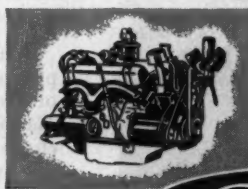
Ford power users can get the service they need *when they need it* by calling the Ford Industrial Power Headquarters nearest to them.

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**YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!**

*"Generally Accepted Accounting Principles for Contractors" is the title of a new booklet published by the American Institute of Certified Public Accountants. This authoritative statement is of such obvious importance to the construction industry that Construction Methods has secured the Institute's permission to reprint it. The part of the booklet, reprinted in this issue, discusses the problems involved in establishing a basis for recording on long-term contracts.*

# ACCOUNTING FOR CONTRACTORS

## **Basis for Recording Income**

The American Institute of Certified Public Accountants has for many years made a concerted effort to narrow areas of difference in accounting practices. Beginning in 1939, the Institute's committee on accounting procedure has published many accounting research bulletins designed to eliminate inconsistency in accounting practices.

Several of the bulletins of the committee on accounting procedure of the American Institute of Certified Public Accountants, such as Bulletin No. 45, "Long-term Construction - type Contracts," deal, almost solely, with contractors and the contracting business. One must look to other bulletins, however, for the Institute committee's opinions relative to the preferred and generally accepted accounting principles as they apply to accounting transactions peculiar to the contracting business.

This booklet represents an interpretation and commentary on the profession's position prepared by the Institute's committee on cooperation with surety companies.

The principal problems and questions relating to accounting for construction contractors revolve around the recording of income on contracts. Such contracts may be of short or long duration and are basically of two types: fixed price and cost-plus.

The basis for recording income on contracts of short duration poses few problems. In the case of such contracts, profits are ordinarily recognized when the facilities are substantially completed and accepted. This accounting procedure has stood the test of time and should not be departed from except for cogent reasons.

The basis for recording income on construction-type contracts of long duration or term does pose special accounting problems because the work often extends over several accounting periods. The work is commonly financed to a considerable extent with advances from the contractor's client, and

billings sometimes run ahead of the actual incurrence of costs by the contractor. The work of the contractor is usually performed "on the job" and the contractor has rights of lien rather than legal title. Thus the contractor's accumulated and incurred costs are more in the nature of receivables from his client than inventories.

The following are comments and interpretations of the Institute committee's accounting recommendations relative to long-term contracts wherein a contractor agrees to a fixed contract price which may result in either a gain or a loss on the completion of the contract. They apply to such long-term projects as the construction of a bridge, a large ship, a section of highway, an office building or apartment house, a dam or canal, a manufacturing plant, a sewer system, or a subway.

### **Selection of an Accounting Method**

Two generally accepted methods of accounting are suggested by the Institute committee for  
*continued*

long-term fixed-price contracts:

1. The percentage-of-completion method—preferable when estimates of costs to complete and extent of progress toward completion of long-term contracts are reasonably dependable.
2. The completed-contract method—preferable when lack of dependable estimates or inherent hazards cause forecasts to be doubtful.

The word "preferable" was used deliberately in the above recommendations to indicate that, while there is a presumption in favor of the 'percentage-of-completion' method where reasonably dependable estimates can be made, there is similarly a presumption in favor of the 'completed-contract' method when dependable estimates are lacking or inherent hazards cause forecasts and estimates to be doubtful.

It would be of course preferable in some circumstances to use one method for certain contracts and another for other contracts. It might appear that a contractor who employs such a combination of accounting methods is being inconsistent. This, however, is not the case. Consistency in application lies in according the same accounting treatment to the same set of conditions from one accounting period to another. The selection of a method should therefore be governed by a set of ground rules consistently followed.

It will be observed that the above refers only to "estimates of costs." It is sometimes suggested that billings constitute a possible basis for the recognition of realized income on partially completed contracts. Such billings may, however, have no real relationship to performance under a contract. In some instances, knowingly or unknowingly, the contractor's client permits the earlier billings to be made in amounts which are excessive when compared with the work actually performed. This is a means of providing working capital for the contractor and the arrangement is referred to as an "unbalanced bid or contract."

In other instances, to protect the owner, the "on account" billings may be purposely kept below the costs incurred, and thus below the amount due for the work per-

formed. It is more common, however, to protect the owner by "retainage," which is usually 10% of each billing, payable on completion of the contract. It will be observed from the above comments that generally billings are not a suitable basis for income or profit allocation. By using costs of comparable work previously performed a contractor may be able to arrange billings under a new contract in such a manner that an appropriate income allocation will result. This situation is obviously not one of mere chance, but in itself does not repudiate the fact that billings may have no real relationship to performance, whereas costs ordinarily do.

It is sometimes suggested, say in relation to a particular long-term contract or to a contractor having numerous long-term contracts, that the selection of the accounting method will give a totally different picture of the financial position and results of operations. However, a close reading of the bulletin comments on the selection of an accounting method indicates that the two methods are mutually exclusive for one specific contract. It is only with the benefit of hindsight that one can say following completion of a five-year contract, "had it been recorded on the percentage-of-completion method instead of the completed-contract method the profit at the end of the first year would have been \$10,000 instead of zero."

#### Percentage-of-Completion Method

The generally preferred method for recording income on long-term contracts is the percentage-of-completion method, which recognizes income on work as a contract progresses. This method has the advantage of periodically recognizing income on a current basis rather than irregularly as contracts are completed. It also reflects the status of incompleting contracts. The major disadvantages of this method is its necessary dependence on estimates of ultimate costs which are subject to uncertainties.

The Institute's committee on accounting procedure recommends that income to be recog-

nized in a contractor's accounts be either:

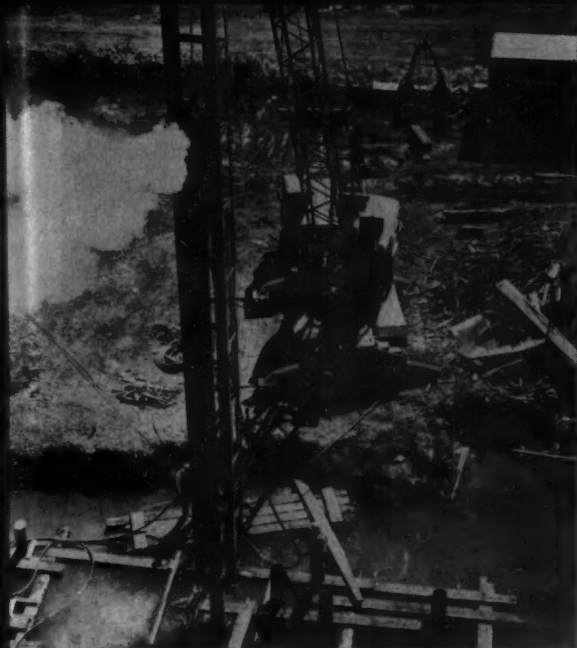
- (a) that percentage of estimated total income that incurred costs to date bear to estimated total costs after giving effect to estimates of costs to complete based upon most recent information, or
- (b) that percentages of estimated total income that may be indicated by such other measure of progress toward completion as may be appropriate having due regard to work performed.

In applying the first of the above methods the bulletin recognizes that, since work performed is the primary basis for income allocation, certain costs may be disregarded as a measure of performance in the early stages of a contract for the purposes of determining income allocation. The bulletin qualifies the statement relative to "incurred costs to date" by saying as follows:

Costs as here used might exclude, especially during the early stages of a contract, all or a portion of the cost of such items as materials and subcontracts if it appears that such an exclusion would result in a more meaningful periodic allocation of income.

The above qualification takes into account situations in which substantial quantities of materials may have been accumulated on a job site but not used, or situations in which engineering or architectural fees have been incurred, which may, for example, represent 15% of total estimated costs when, in terms of work performance the contract was only 5% completed. In these circumstances income recognized as allocable to the period should be related fully to only 5% of the total, and not to the extent of 15%.

Under the second alternative above, "such other measure of progress" is intended to recognize the possibility of using other factors as measures of percentage-of-completion where they, more appropriately than costs incurred to date, measure work performed. Such measures may be, for example, cubic yards of excavation for foundation contractors; or cubic yards of cement or asphalt laid for highway contractors; or engineering or architectural estimates of percentage of completion. Where a more meaningful

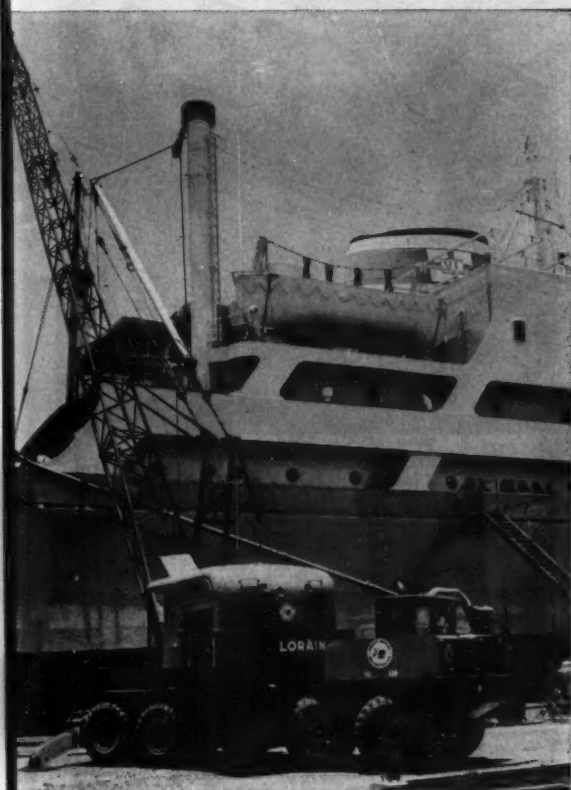


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Set four outriggers in less than a minute . . . take only 20 seconds to retract to an 8-inch clearance for fast move-ups . . . automatically adjust to uneven ground. These are just some of the ways Lorain's exclusive Power-Set Outriggers will speed your operations.

Here's how Power-Set Outriggers pay off all over the country. From *New York*: "We waited over half an hour while a competitive crane at the other end of a big lift set outriggers. We were ready in seconds." From *Minnesota*: "We saved 45 minutes on former set-up time on a side hill job." From *Pennsylvania*: "We have always used crawler machines because we wouldn't bother setting outriggers. Now it's Lorain Power-Set Outriggers for us."

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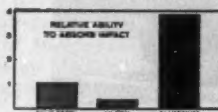


The TEC Division of The Heil Company, Cleveland, Ohio, has built seven aluminum dump trailers like the one pictured above for Arrow Trucking, Inc., also of Cleveland. And TEC couldn't have a more satisfied customer. This is because construction of Alcoa® Aluminum enables each unit to haul 53,200 lb of coal versus 48,000 lb for a comparable steel unit.

Alcoa Aluminum Drop Center Forged Disc Wheels on the trailers and tractors account for almost 500 lb of extra payload and provide better handling, better brake life and less front-end maintenance. And payload is further increased by extensive use of aluminum in the Autocar Model A-10264 Tractors, which eliminates at least 1,500 lb of dead weight.

Arrow has a contract to deliver coal to a large public utility, and all seven units are currently kept busy six days a week on this account. While making only four trips a day (167 miles average round trip), the extra payload provides increased revenues of \$24.44 per day per unit. That's better than \$6,800 per year added profit on each trailer! Obviously, it doesn't take Arrow long to write off the slight additional premium paid for aluminum.

The corrosion problems that have always plagued coal transporters come to an end when they switch to aluminum bodies. Leading manufacturers are ready to bring you these advantages by fabricating dump bodies of Alcoa Aluminum to your specifications, or by supplying economical standard designs. For more information and the names of manufacturers near you, write: Aluminum Company of America, 1774-L Alcoa Building, Pittsburgh 19, Pa.



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allocation of income would result, it is, of course, permissible and even more appropriate for one contractor to use different methods of estimating work performed on several different types of contracts.

### Completed-Contract Method

The completed-contract method recognizes income only when a contract is completed, or substantially so. During the period of construction, billings and costs are accumulated, but no profits or income are recorded before the substantial completion of the work. A contract may be regarded as substantially completed if remaining costs are not significant in amount.

This method's principal advantage is that it is based on results as finally determined, rather than on estimates for unperformed work which may involve unforeseen costs and possible losses. Its disadvantage, of course, is that it does not reflect current performance when the period of a

contract extends through more than one accounting period. Under the latter circumstances, the method may result in an irregular recognition of income, and in some situations (for example, single proprietorships or partnerships) it may, through an irregular recognition of taxable income, subject the individuals concerned to greater income tax liabilities.

It is to be observed that Bulletin No. 45, in referring to the completed - contract method, states income is to be recognized when a "contract is completed, or substantially so." The latter words, defined and explained above ("A contract... is substantially completed if remaining costs are not significant in amount") had twofold significance to the Institute committee. First, seriously misleading results could occur as for example if a contractor was not permitted to recognize income under this method at (say) his December year-end and was forced to de-

fer the recording until January, or, worse still, until months later when the project was declared legally completed in accordance with local ordinances and codes. Secondly, the committee properly desired to discourage a deliberate postponement of the recording of income on a contract by deferring the performance of some minor part of the work.

It is common practice not to accumulate as contract costs general and administrative expenses and similar general expenditures sometimes described as overhead or indirect expenses. Such expenses are usually treated as "period costs" (i.e., current expenses). Under the percentage-of-completion method, such difficulty is rarely encountered because there is periodic recognition of income from which such items can be deducted. However, this may not be the case when the completed-contract method is employed. The Institute committee therefore stated:

continued on page 148

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**1936**—The performance of H. Turner & Son's first Cat Excavator Engine helped establish their company as one of the leading contracting firms in southwestern Wisconsin.

**1959**—More than twenty years later, this firm operates in several states with 81 Cat Engines in its spread.



# WHY HE'S INSISTED ON ENGINES FOR OVER 20 YEARS

**Herb Turner, Jr., president of H. Turner & Son, Contractors, has 81 Cat Engines in his spread. Why he does...and why he doesn't buy equipment if the engine brand he wants cannot be specified...makes interesting reading for contractors everywhere.**

"Buying engine power is just as important today as it was when I bought my first Cat Diesel Engine in 1936.

"The performance of that engine could have meant success or failure to my business. While success or failure today doesn't count on a single engine, I can't afford to risk loss with an unreliable engine. So when I specify an engine, dependability is way ahead of everything else. That engine could be the reason for a job going down. For example, suppose I have an excavator loading a crusher on a road-paving job and the engine

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"When selecting an engine, I'll specify the kind every time that has given me the best record of dependability. If a dealer resists selling me the engine I want, he may not get the excavator business either.

"Fortunately resistance is the exception rather than the rule. And no matter where I bought a Cat Engine, the Caterpillar Dealer has provided parts and excellent service wherever and whenever I have needed it."

*Herb Turner, Jr.*

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- In order to be assured of a Cat Engine it is necessary to specify when the excavator order is placed.
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When the completed-contract method is used, it may be appropriate to allocate general and administrative expenses to contract costs rather than periodic income. This may result in a better matching of costs and revenues than would result from treating such expenses as period costs, particularly in years when no contracts were completed.

The words "may be appropriate" are used deliberately since a

contractor who employs the completed-contract method may be engaged in numerous projects and it may be preferable for him to charge those expenses to periodic income as they are incurred as no material distortion of net income would occur. However, if there is only one contract (or just a few contracts), and no income (or an abnormally small amount of income) is recordable on the

completion of contracts in a specific period, seriously misleading results might be shown if general and administrative expenses were expensed as incurred in each accounting period. The election by the contractor to allocate general and administrative expenses to contract costs, like the selection of one of the two methods of accounting for contracts, should be governed by a set of ground rules, consistently followed.

The bulletin cautions its interpreter as follows:

In any case there should be no excessive deferring of overhead costs, such as might occur if total overhead were assigned to abnormally few or abnormally small contracts in process.

Here the committee apparently had in mind that, when construction volume was at a low point, only a reasonably allocable or normal amount of overhead costs should be assigned to contracts in process. The remaining general and administrative or overhead costs should then be shown as period expenses even though net losses were thereby produced.

#### Provisions for Foreseeable Losses and Renegotiation Refunds

In accordance with the long-established accounting practice of anticipating losses (but not gains), Bulletin No. 45 recommends that when current estimates of total contract costs indicate a loss, provision should be made for the entire loss on the contract. This recommendation applies to both the percentage - of - completion method and the completed-contract method, even though the latter does not permit the recording of income prior to completion. However, as to both methods, the bulletin also states:

If there is a close relationship between profitable and non-profitable contracts, such as in the case of contracts which are parts of the same project, the group may be treated as a unit in determining the necessity for a provision for losses.

This qualification is added so that when several contracts are parts of the same over-all project, they will be treated as a unit in estimated profits or losses. If this



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# ALL NEW INSLEY TRUCK CRANE

## 20-ton capacity yet lightweight for travel

● The all new Insley Type M gets to the job and on the job *fast* with a minimum of preparation time.

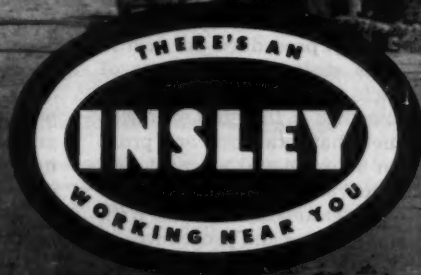
Such features as simplified back-hitch gantry (requiring only minutes to raise or lower), independent boom hoist, pendant type suspension with floating bridle connections to boom for quick change of sections, hammer-head type boom point with three wide flange sheaves, and a modern wide-vision cab are but a few of the reasons why contractors are

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were not done, revenues and costs relating to the same project might be recorded in different accounting periods.

Ordinarily, a provision for loss on a contract should not be necessary unless the total estimated direct contract costs are expected to exceed the total contract price and then only to the extent such costs exceed the contract price unless general and administrative expenses, or a portion thereof, have been allocated to the contract costs under the completed-contract method. In the latter case in determining the need for a provision for loss, the total general and administrative expenses that it is estimated will be incurred and allocated by the time of completion of the contract should be considered together with the estimated direct contract costs.

In computing the need for provisions for losses on contracts, penalty liabilities for indicated late completion should be included in total estimated costs. When the contractor is working on a "cost-plus" basis, unreimbursable costs—be they unauthorized in themselves or amounts in excess of those authorized or in excess of "guaranteed maximum costs"—should be considered in determining whether the contract is a profitable or unprofitable one. Under some circumstances consideration will need to be given to such other factors as escalation, change order extras, price re-determination, etc. On the other hand, incentive bonus provisions for early completion or for low costs should also be taken into account in determining the gain or loss status under contracts.

With the accrual basis of accounting, recognition is given to revenues, costs, and expenses to the fullest extent possible in the periods to which they relate. As previously indicated, it is also, with the percentage-of-completion method, a generally accepted accounting procedure to accrue revenues under certain types of contracts on the basis of partial performance if the circumstances are such that total costs and profits can be estimated with reasonable accuracy and ultimate realization is reasonably assured. With these principles and procedures in mind, the question is sometimes

raised: Why not recognize the loss over the period of the contract?

Assuming the exception commented on later under this section is not applicable, it must be said that the accounting dogma of anticipating losses when they are reasonably determinable becomes dominant over the two aforementioned principles. In brief, the entire loss accrues at the time when the current estimates of total contract costs indicate a loss because such estimates indicate that the loss will not be recoverable from future revenues on a contract or group of contracts relating to the same project. Such being the case, there is no merit in postponing the recording of portions of a loss to the future. The Institute committee has taken a parallel position on the recognition of losses in bulletins dealing with such matters as inventory losses, losses on purchase and sale commitments, and unrealized losses on foreign exchange.

Under some circumstances, government contracts and sub-contracts are subject to renegotiation—that is, an adjustment of the original contract price with a refund payable to the government. Provisions for renegotiation refunds are similar to other provisions for foreseeable losses on contracts to the extent that when such probable refunds can be reasonably estimated, liability therefor should be recognized in the financial statements. The amount of refund recognized by the provisions should not, however, exceed that applicable to billings recognized as income to that date.

Provision for such refunds should be included in the statement of financial position among current assets or liabilities in accordance with the principles outlined in the section "Working Capital." When such refunds cannot be estimated, it should be disclosed that the contractor is unable to determine renegotiation effects, and that there are consequent uncertainties in the financial statements. Renegotiation provisions differ from other loss provisions in that they do not normally produce a contract loss but a reduction in previously anticipated profits. Renegotiation refunds involve only a refund of "excessive profits." The account-

ing treatment of such refunds in the income statement also differs from other loss provisions which are shown as contract costs. Provisions for renegotiation should preferably be treated as a deduction from contract revenues.

This query has been made: If the completed-contract method (rather than the percentage-of-completion method) is selected as a result of a lack of dependable estimates of costs, are not the estimates equally unreliable for purposes of estimating an allowance for loss on a contract? The provisions for a loss should represent, under either method, the best judgment that can be made in the circumstances. If "inherent hazards" are not present, it must be presumed that the completed-contract method is selected because there is no dependable estimate of costs. However, the selection and application of this method in accounting for the normal business operations of a contractor does not of itself preclude the fact that a loss will become clearly apparent at some stage of completion. The bulletin therefor uses the words "expected" loss to indicate that the actual realization of the loss should be reasonably certain. To "expect" or to be reasonably certain that a loss will occur, a contractor must be presumed also to be in a position to approximate reasonably the amount of such a loss. The "long - established accounting practice of anticipating losses" referred to above, does not recommend arbitrary provisions for losses, but presumes the exercise of care and good judgment.

When provisions for estimated losses on uncompleted contracts are made on the books and in the financial statements, and such provisions are not currently deductible for income tax purposes, it would be proper to make such provisions "net of taxes." That is to recognize (at the estimated effective tax rate) the future tax reduction at the time or times that the loss is deductible. If this were not done, the contractor's income would be improperly reduced in one accounting period by, say, an amount equivalent to half the total provision for loss and the income would be improperly increased in the sub-

continued on page 154

# A Handful of Aeroquip Fittings and Some Hose Handle Our Trouble Calls Easily!"

Says Bill Halloway, Master Mechanic, McGuire & Hester, Oakland, Calif., Paving and Pipe Line Contractors



Aeroquip Hose Lines, with Reusable Fittings, completely replaced copper tubing formerly used as feeder lines on Emsco stomper.



Where copper tubing crystallized in a single day, Aeroquip Flexible Hose Lines have absorbed the stomper's severe shock and vibration for more than a year.

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McGuire & Hester's equipment fleet includes two stompers, used in their paving contracts. When breaking out hard concrete, the air hammer control lines, formerly of copper tubing, crystallized in as little as one day.

More than a year ago, Aeroquip Flexible Hose Lines replaced the copper tubing. Under conditions of severe shock and vibration, the Aeroquip lines have proved completely trouble-free. The company has now standardized on Aeroquip.

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Find out how your fuel, air, water and hydraulic line problems can be solved, the Aeroquip way. Call your Aeroquip distributor, listed under "Hose" in your yellow page phone book.

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**Aeroquip 2601** Hose is lightweight, durable. Specific uses: Heavy-duty engine oil and fuel lines. May be used for other approved applications.

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**Aeroquip 2651** Medium Pressure Hose has single wire braid reinforcement, resists abrasion, oil and mildew in hydraulic, gasoline, crude, fuel and lube oil, air and water lines.

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LeTourneau-Westinghouse designed this bottom-dump hauling unit to carry the greatest payload with the least possible empty weight. The trailer weighs only 15½ tons but will haul a whopping load of 80 tons or more. This gives it an extremely high ratio of payload to weight and makes the unit most economical on fuel, tires and other operating costs.

The trailer body includes USS MAN-TEN Brand High Strength Steel and USS "T-1" Constructional Alloy Steel in the highly stressed rear-axle assembly. This combination produced a tough wear-resisting unit that would take the beatings from coal or rock or whatever had to be hauled.

MAN-TEN Steel combines a minimum yield point of 50,000 psi with superior abrasion resist-

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Mr. Big hauls as much coal as 1½ railroad cars but weighs less than most 50-ton capacity trucks. USS Design Steels make the difference.

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ance. "T-1" Steel was used because its extra high yield strength (100,000 psi minimum) was needed to take the road shocks at 40 miles per hour. Both steels saved weight and resulted in a payload increase of 10 tons over conventional construction.

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sequent accounting period, or periods, by the tax effect of the deduction of the loss in that period or periods. By providing for the loss "net of taxes," the estimated net loss (i.e., after taxes) is properly reported in the accounting period in which the loss is foreseen.

Loss provisions "net of taxes" presuppose that there is other taxable income or "carryback" privileges then available at least to the extent of the deductible contract loss. Were this not so the contract loss would produce no reduction in income taxes and should not then be recorded "net of taxes." It would not be proper accounting to anticipate future taxable income and, assuming a "carry forward loss," provide for contract losses "net of taxes."

In computing the tax effect, the estimated rate should be based on rates in force during the period covered by the income statement with such changes as can be reasonably anticipated at the time the estimate is made. It is, of course, appropriate to consider the tax effect as the difference between the tax payable with and without including the loss as a reduction of taxable income. All significant income taxes, U. S. Federal, foreign, state and local, should be considered in the computation, and reasonable approximations in round figures will suffice.

### Cost-plus Contracts

Cost-plus contracts are commonly entered into by contractors. As earlier indicated they are employed in a variety of forms such as cost plus a percentage of cost, or cost plus a fixed fee. In the latter circumstance, defined costs may be limited and penalties made payable under guarantees, such as guaranteed maximum costs (or billings). When there are penalties, it is usual to provide as well for incentive or bonus payments.

Under cost-plus agreements, contractors usually are reimbursed at intervals for their expenditures and, in addition, are paid a specified fee. Payments on account of the fees (less "retainage," 10% or another amount which is withheld until completion) are made from time to time as specified in the agreements, usually subject

to the approval of the client's employees or an agent, such as the architect. In most cases the amount of each payment is, as a practical matter, determined by the ratio of costs incurred to total estimated costs.

Cost-plus agreements often provide that ownership of all material vests in the client as soon as the contractor is reimbursed for his expenditures or, in some instances, immediately on receipt of the material by the contractor even though not yet paid for. In such instances, the contractor has a custodianship responsibility for these materials. Frequently the client makes cash advances to provide working funds to the contractor and often such sums are applied against the final payment due under the contract.

The selection of a generally accepted accounting method for recognizing income under cost-plus type contracts generally parallels that mentioned for fixed-price contracts. It is thus generally accepted procedure to accrue revenues and thereby recognize profits on the basis of partial performance when total profit can be estimated with reasonable accuracy and ultimate realization is reasonably assured. It is acceptable to accrue fees as they become billable. When estimates are unreliable the completed-contract method is preferred to the percentage-of-completion method, as with fixed-price contracts.

Provisions for foreseeable losses, including penalties, guarantees, etc., should also be made at the time the loss is indicated. Comments relative to such provisions have already been made—see subsection "Provisions for Foreseeable Losses, etc."

One problem peculiar to cost-plus contracts is: What amounts should be included in revenue accounts—the reimbursable costs and the fee, or the fee alone? Some contracts are of a service nature under which the contractor acts solely in the capacity of an agent. Such contracts appear to call for inclusion of the "fee" alone in the income statement and, of course, the contractor would not show materials purchased and owned by his client among his own assets. In other situations the contractor's position is in many respects that of an

ordinary principal. For example, he is responsible to employees for salaries and wages, and to subcontractors and other creditors for materials and services, and the contractor often uses his own facilities in performing his responsibilities under the agreement. In such situations it is proper to include reimbursable costs as well as fees in the income statement.

In summary, then, judgment must be exercised as to which method provides more useful information. The terms of each particular agreement, naturally influence the decisions.

### Terminated Government and Other Contracts

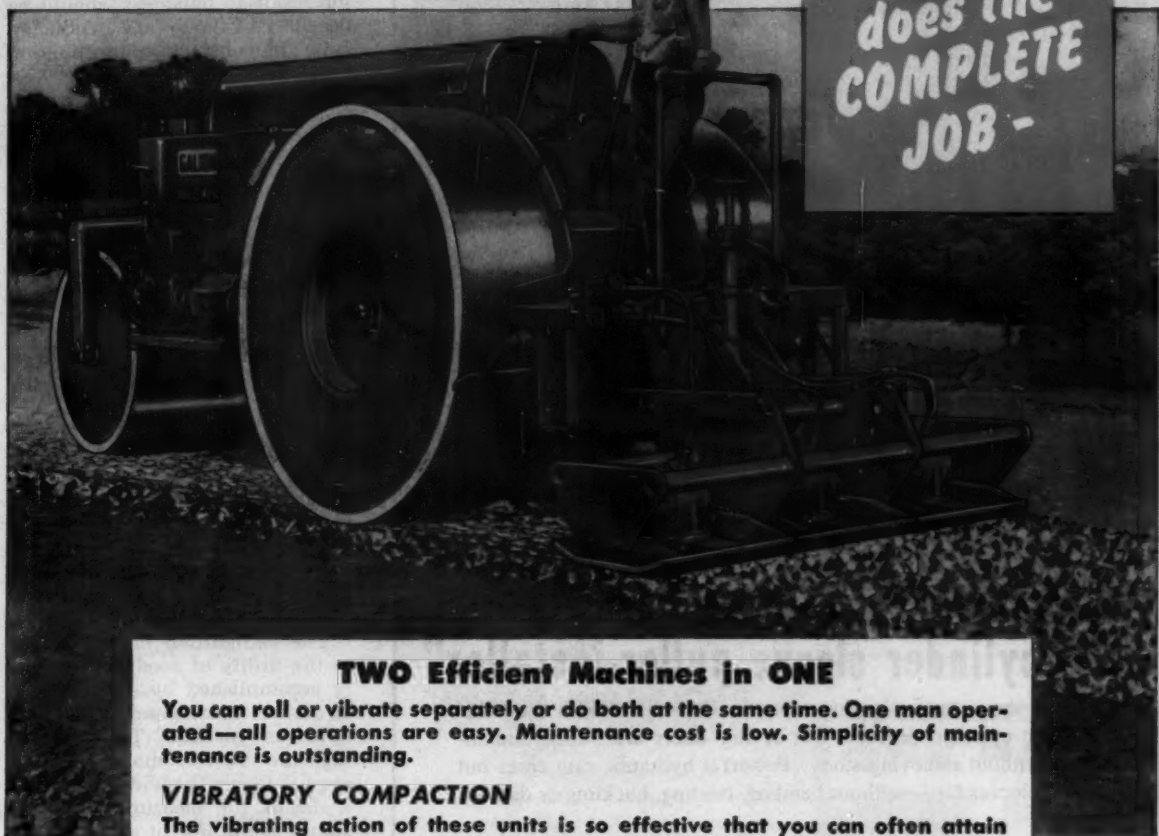
For the convenience of the government, contracts may be terminated to adjust production for the military services or contractor's clients may terminate their contracts for various business reasons. Thus, termination has the effect of converting an active contract in process of execution into a claim in process of liquidation, or, from an accounting standpoint into an account or claim receivable.

Under ordinary circumstances, a termination claim should be classified as a current asset. Under either a fixed-price or cost-plus contract, any remaining profit accrues as of the effective date of termination, not at the date of final settlement or some intermediate date. It will be observed that, from the viewpoint of timing, this accounting parallels recognition of foreseeable losses.

The profits to be accrued should of course be estimable and realization thereof reasonably assured. Full disclosure should be made by footnote if determinate elements or items of known controversial nature exist and estimates are not practicable. While the total claim, and particularly the profit allowance, is subject to negotiation, termination articles provide for a formula settlement allowing definite percentages of profit based on costs in the event of the failure of negotiations. Such articles thus fix a minimum profit allowance. Under most circumstances, a contractor may accrue the minimum profit allowance determined by the formula when he is otherwise unable to

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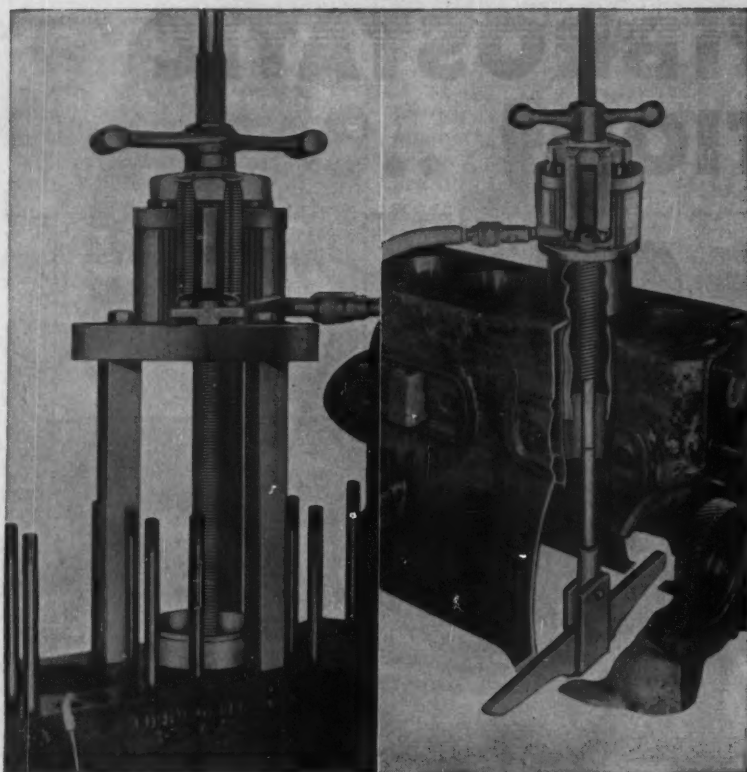
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## ACCOUNTING FOR CONTRACTORS *continued*

determine a more appropriate profit allowance.

Items retained by the contractor as scrap or for his own use or for resale to outsiders, should be properly valued and deducted from the contractor's termination receivable. Such retentions in some instances may be of such significance that a contractor may make a so-called "no-cost" settlement, in which case no termination claim is made and no profit accrues until the future disposition of the retained items.

The primary basis for properly valuing items retained by a contractor is cost. In principle, cost means the sum of expenditures directly or indirectly incurred in bringing an article to its existing condition and location. A departure from this basis of pricing is required, however, when the utility of the goods is no longer as great as its cost. Often this may be the case to a contractor on the occasion of a termination when some items may cease to have any utility value other than as scrap.

The recognition of a lowering in the utility of goods is generally accomplished by stating them at a lower level commonly designated as "market." The accounting rule "cost or market whichever is lower" provides therefore a means for measuring the residual usefulness of an inventory expenditure. The term "market" means current replacement cost, by purchase or reproduction. In applying these rules, judgment must be exercised and losses should not be recognized unless there is clear evidence that a loss has been sustained. For example, replacement or reproduction prices would not be appropriate when the estimated sales value, reduced by costs of completion and disposal, is lower. Furthermore, where the evidence indicates that cost will be recovered with an approximate normal profit on sale, no loss should be recognized even though replacement or reproduction costs are lower.

The claims of subcontractors can pose problems in the event of a contract termination. Frequently the contractor has no control over the filing of subcontractors' claims and may not know their amount until some time after the termination date. If the amounts

of claims of subcontractors are not reasonably determinable, this should be disclosed by footnote in the contractor's financial statements.

There is also the possibility that the contractor may suffer loss through his failure to recover the full amount of his liability on subcontractors' claims.

The Institute committee on accounting procedure considered either of two alternative methods of presenting subcontractors' claims acceptable in the financial statements of a contractor since both methods meet the test of adequate disclosure. On the one hand, recoverable subcontractors' claims may be considered to be in the nature of contingent liabilities with an offsetting contingent asset in the form of the termination claim. These offsetting amounts may, as no loss is expected, be omitted from the contractor's financial statements and their existence disclosed by footnote. As another alternative, subcontractors' claims may be recorded in the contractor's statement of financial position as current liabilities and the amounts recoverable by the contractor may be included in his termination claim receivable.

## Useful Information

These *Construction Methods* reprints contain valuable information for contractors. Send your requests to: Editor, 330 West 42nd Street New York 36, N. Y.

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## KOEHRING WORK CAPACITY *in action...*



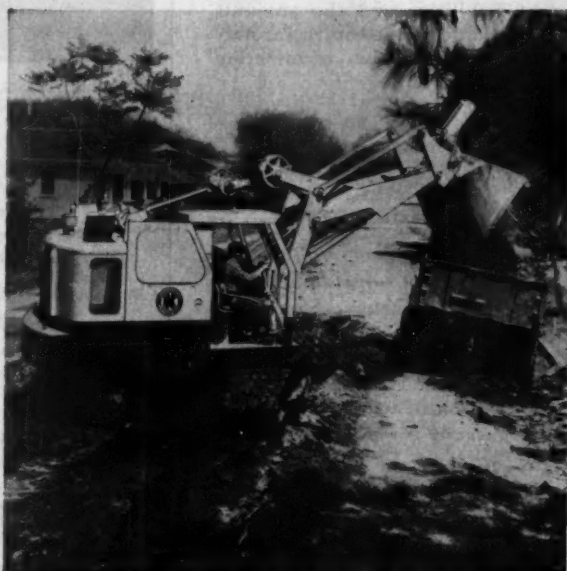
**Installing 6-foot storm sewer** — Over 2 miles of 72-inch concrete sewer pipe are being placed in trench 30 feet deep. Koehring 36-ton 605 crane sets an 8-foot length of pipe in place, while a companion 605 dragline works ahead, scooping trench out of loose, shifting sand. The 2-rig Koehring team advances an average of 128 feet daily.



**Pipeline crosses stream** — and a 1-yard Koehring 405 hoe wades into the gravel-bottom creek, digs submerged ditch under "dragline" conditions. Saves a production delay in remote, mountainous area, helps keep cross-country pipeline job moving on schedule. How deep can the 405 dig? 26½ ft. with standard 23-foot hoe boom!



**Pre-boring for pilings** — at bridge approach on new expressway, 10-in. holes are bored at an angle 16 ft. deep through hard, compacted fill. This pre-boring method speeds pile driving. Both the crane and drill are Koehring products. Truck crane is a Koehring 15-ton 205 (with Ka-Mo drill, built by an associate division of Koehring).

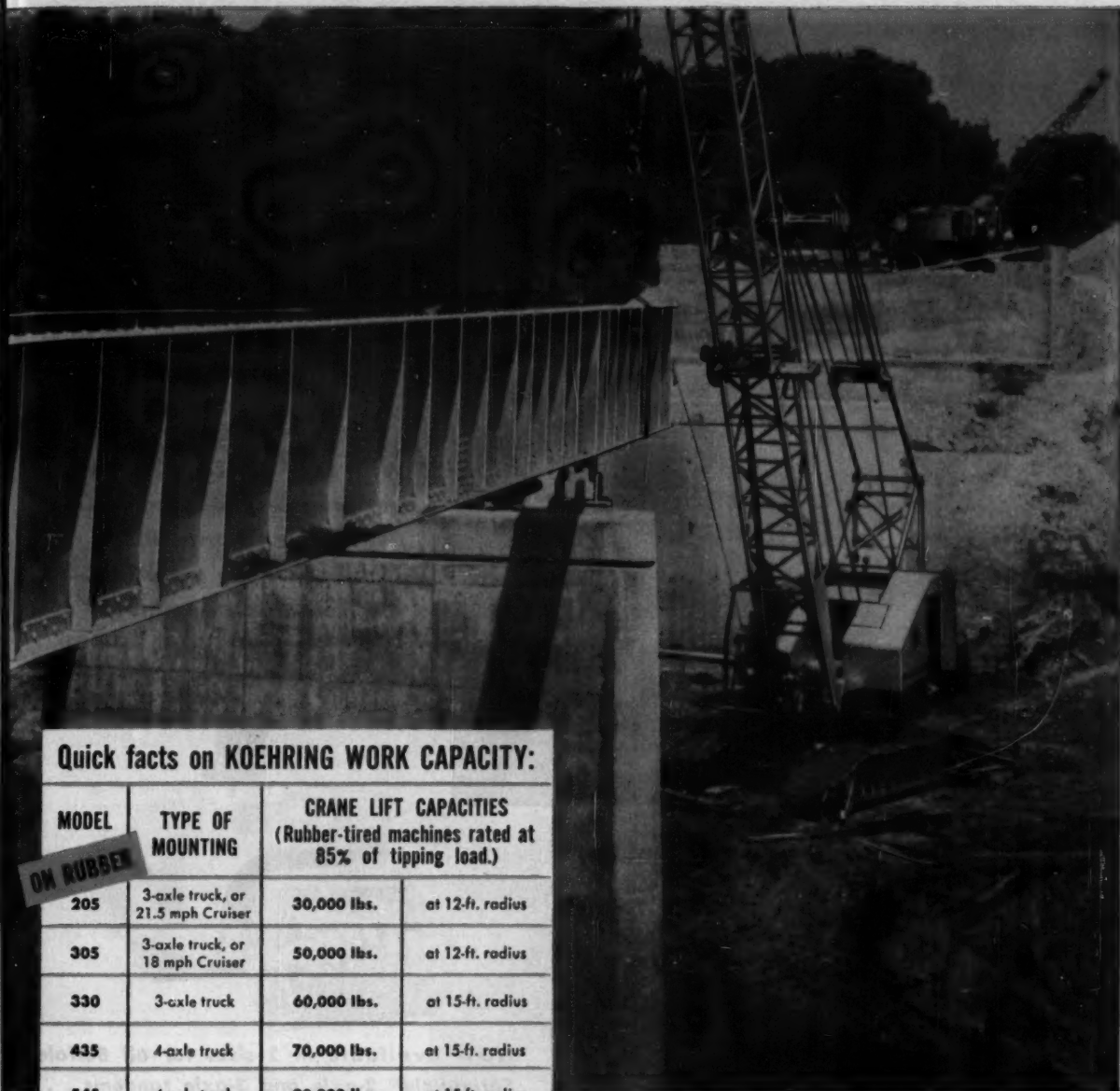


**Full-revolving SKOOPER** — combines big loader capacity with shovel efficiency — digs, swings, dumps, then swings back to digging position, *all without traveling*. Twin hydraulic rams crowd the 2-yd. bucket along a 7-ft. level cut from "stand-still" position — or dig any angle of bank slope. 3 types of buckets. Excavator-crane convertibility.

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### Quick facts on KOEHRING WORK CAPACITY:

MODEL	TYPE OF MOUNTING	CRANE LIFT CAPACITIES (Rubber-tired machines rated at 85% of tipping load.)	
ON RUBBER			
205	3-axle truck, or 21.5 mph Cruiser	30,000 lbs.	at 12-ft. radius
305	3-axle truck, or 18 mph Cruiser	50,000 lbs.	at 12-ft. radius
330	3-axle truck	60,000 lbs.	at 15-ft. radius
435	4-axle truck	70,000 lbs.	at 15-ft. radius
545	4-axle truck	90,000 lbs.	at 15-ft. radius
ON CRAWLERS		CRANE LIFT CAPACITIES (Crawler ratings based on 75% of tipping load.)	
	Size shovel		
205	½ Cu. Yd.	20,000 lbs.	at 10-ft. radius
305	¾ Cu. Yd.	30,000 lbs.	at 12-ft. radius
405	1 Cu. Yd.	40,000 lbs.	at 12-ft. radius
545	(Crane only — 85% rating)	90,000 lbs.	at 12-ft. radius
605	1½ Cu. Yds.	72,300 lbs.	at 12-ft. radius
805	2 Cu. Yds.	104,200 lbs.	at 12-ft. radius
1205	3 Cu. Yds.	190,000 lbs.	at 12-ft. radius

### Bridge-building "SPRAWLER" outlifts its own weight by 14%

Hoisting highway bridge girders is easy work for this Koehring® 545 "SPRAWLER"™ crane. With *pivoting outriggers* sprawled into position, it lifts up to 90,000 lbs.! (Weighs approx. 79,000 lbs.) Raise the pedestals for ground clearance, or remove pedestals and swing outriggers against crawlers — and the 545 "walks" with 61,500-lb. load! It has 40 to 120-foot pin-pad connected boom — handles maximum 150-foot boom-and-jib. For job-to-job transport, "SPRAWLER" strips to approx. 47,500 lbs. — *with crawlers intact.*



Extra lift capacity means MORE WORK CAPACITY with all attachments



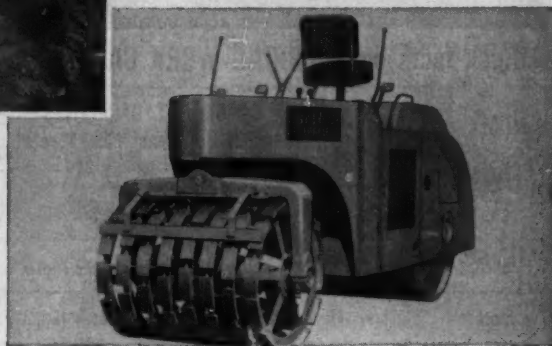
## How to get 3 to 7% GREATER COMPACTION DENSITY

◀ With **SEGMENTED ROLL** you get greater and more uniform densities on earth fills, stabilized base materials, hot and cold-mix bituminous surfaces . . . in fewer passes!

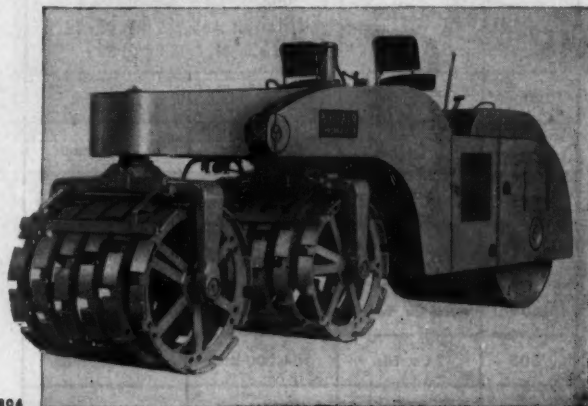
Quickly interchangeable . . . readily added to B-S-R rollers now working in the field.

Combining the best compaction benefits of both the projecting lug-type roller, and smooth-faced roll, Buffalo-Springfield 2 and 3-axle tandems offer you a unique method for faster, better compaction on a wide range of materials. Optional segmented roll, mounted in guide-roll position, applies pressure in a flat foot-print pattern . . . and is followed by smooth drive-roll pressure, *all in a single pass*. Result: job-performance tests show 3 to 7% greater compaction densities, as compared with conventional rolling methods.

Segmented roll is faced with staggered rows of heavy steel pads, which operate on an "interrupted pressure" principle of compaction. The pads individually enter loose materials with a minimum of displacement sideways or forward . . . then leave the material without disturbing compacted areas. All compaction effort is exerted in a *downward direction*. Segmented roll is, of course, readily interchangeable, as your work requires. This is a real time-and-money-saving opportunity worth looking into! Better call your Buffalo-Springfield distributor about this right away.



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# Construction Men in the News...



**NEW OFFICERS**—John Volpe (left), nominee for president of AGC in 1960, chats with James Cawdrey, the 1959 president, and Clare Miller, vice presidential nominee.

## AGC Nominates Officers for 1960

John A. Volpe and M. Clare Miller are the nominees to head the Associated General Contractors of America in 1960. Volpe, currently vice president, will become president. Miller will succeed Volpe as vice president.

Both men were nominated at the midyear meeting of the AGC governing and advisory boards in Kansas City, Mo. The official membership vote takes place in December. There is no election contest. Officers will be installed at the AGC convention in March.

Volpe was the first man to hold the post of Federal Highway Administrator. He is also a former Commissioner of Public Works for Massachusetts. He heads his own firm, the John A. Volpe Construction Co., Malden, Mass.

Volpe has served as president of the Massachusetts AGC chapter and on several national boards and committees. He succeeds James W. Cawdrey as president.

Miller heads the San Ore Construction Co., Inc., McPherson, Kans., founded by his father in 1921. The firm built airfields and other defense projects during World War II. Recently, it has been involved in joint ventures in the construction of the Falcon Dam on the Rio Grande and Cedar Bluff Dam in western Kansas.

A former chairman of the AGC Highway Contractors Division, Miller is now co-chairman of the national joint cooperative committee of the AGC and the American Association of State Highway Officials. In these posts he presented AGC views to Congress-

sional committees. He also served three terms as president of the Kansas AGC chapter.

During World War II, he was construction chief for a sector of the China-Burma-India Theater. In the Korea action, he served as commanding officer of the 439th Engineer Construction Battalion.

## Cunningham-Limp



**JAMES FARR BEESON**, vice president since 1954, is the new manager of the southeastern division offices opened in Atlanta by Cunningham-Limp Co., Detroit engineering and construction company. Beeson has directed many of the company's projects in the south, including a new plant for Michigan Chemical Corp. at Port St. Joe, Fla., for the production of magnesium oxide.

Beeson worked on the construction of the third lock for the Panama Canal and, during World War II, the planning and layout

of sites for advanced air bases and hospitals.

## Folmar & Flinn

**ALFRED K. ALLEN** is the new executive vice president of Folmar & Flinn Industries, Inc., Montgomery, Ala., construction and engineering firm. He will supervise the company's construction.

Allen comes to the firm from Utah Construction Co. where he was vice president in charge of construction. His work with Utah included construction of an 8-mi tunnel at Fresno, Calif., an underground shaft 23 ft in dia. and 3,600 ft deep in Saskatchewan, and a \$15-million missile base at Santa Maria, Calif.

Previously, he was vice president of Dunn Construction Co., Birmingham, and Blount Bros. Construction Co., Montgomery.

During World War II, Allen was a road engineer with the Corps of Engineers on the Ledo Road connecting China, Burma, and India.

## Raymond



**CHARLES R. GRAFF** is the new vice president for the Raymond Concrete Pile Co. in charge of west coast operations. He succeeds Otis C. Struthers who retires Dec. 1.

Graff joined Raymond as a field engineer and served later as construction superintendent on West Coast construction jobs. He will continue as head of the San Francisco district and make his headquarters there.

# How would you load rock this size?

## Shoot to size? Cable and lift? Shovel?

There are only two tractor shovels in the business built for work like this . . . the Allis-Chalmers 225-hp, 4-yd HD-21G and the 150-hp, 3-yd HD-16G. They're in a class by themselves. If you move ore, rock,

gravel or overburden . . . if you need a machine that will pioneer, rip, load and handle a multitude of jobs, see them in action. They'll go it alone or team up with other machines to help improve your profit.

**Increase bidding power**—You're way ahead in bidding flexibility with a big-capacity tractor shovel. Jobs miles away are simple transport operations with Allis-Chalmers BIG tractor shovels. Forget about expensive dismantling, problem loading, hauling and setup again at job site.

**Handle scattered jobs economically**—Wherever there's loading to do on a new job, these two dependable units "walk" to work . . . through mud—over rough terrain—those spots where only crawlers can go! They build their own roads—dozing, cutting, filling, compacting . . . load up to 4 yd at a clip\*

What's more . . . BIG HD-21G's—16G's are not single-purpose units. They're pioneering machines. They'll open up new cuts or make quick work of clearing, piling stumps, brush or boulders. And, of course, loading, stockpiling and cleanup are their steady specialties.

**They're ripping specialists**—Long track, outstanding balance and power enable HD-21G's—16G's with rear-mounted Tractomotive rippers to open up tough material over two feet deep. Enough hydraulic penetrating pressure is developed to lift the tractor itself off the ground.

You can afford to use these big tractor shovels on many utility chores

—from breaking up concrete roadbeds with 72,700-lb break-out force, to complete one-man, one-machine demolition operations. When you apply the abilities of the HD-21G—HD-16G to your own jobs, you'll see how either one or both of these production units can cut costs . . . put a sharper point on your favorite bidding pencil.

**See your Allis-Chalmers dealer**—He's the ONLY man with tractor shovels from 72 to 225 hp . . . from 1½ to 7¼ yd. He'll be happy to fill in the details—show you an Allis-Chalmers tractor shovel in action. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

### HD-21G

225-hp, torque converter drive  
4-cu-yd standard bucket  
66,500 lb



\*Special-purpose buckets available up to 7¼ yd.

### HD-16G

150-hp, torque converter drive  
3-cu-yd standard bucket  
48,600 lb



**Walk to work**—This Allis-Chalmers HD-21G makes its own way to rugged, inaccessible working areas . . . can "walk to work" where most units with 4-yd capacity would have to be brought in piecemeal.

## ... move ahead with ALLIS-CHALMERS



Big Allis-Chalmers tractor shovels are built to handle rock this size with ease and durability. Watch one work—or ask the man who owns one about the capacity, versatility, and easy transport they offer . . . three of the most desirable profit characteristics you'll ever find in any one machine!



One-machine fleet—HD-16G handles everything on building removal projects like this. Tearing down the old, loading out scrap, fine-grading in preparation for the new.



No problem loading—Moving from job to job quickly with the HD-21G and HD-16G adds even more value to these two heavy-duty tractor shovels.



.....power for a growing world

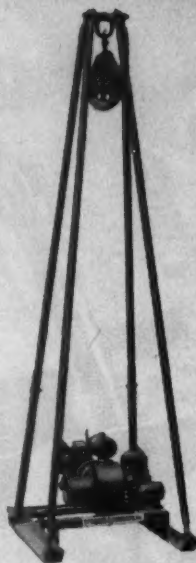
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Complete with platform  
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used on axle assemblies for  
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**10" DEEP SIDE CHANNELS**  
provide rigid support right  
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**HYDRAULIC TILT CONTROL**  
(Optional) Cushions tilt ac-  
tion—lowers like a feather



**HEAVY DUTY BRAKES**  
(Optional) Available in air,  
vacuum, or electric types

# Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distribution, sales personnel and other activities.

## Distributor Appointments

**McKiernan - Terry Corp.:** The Construction Equipment Division has appointed Gierke-Robinson Co. of Davenport and Des Moines, Iowa, as distributor for northwestern Illinois and central and eastern Iowa.

**Simplex Forms System, Inc.:** Arnold J. Werner Co. of Detroit, Mich., and Empire Equipment Co. of Buffalo, N. Y., have been appointed as distributors of the full line of Simplex forms, accessories, and tie wires.

**Chicago Pneumatic Tool Co.:** Western Contractors Supply Co. of Melrose Park, Ill., has been named distributor of CP construction equipment. The distributor was also named as agent for truck and crawler-mounted, hydraulic drilling equipment manufactured by the REICHdrill Division of Chicago Pneumatic.

## On the Sales Front

**Caterpillar Tractor Co.:** The company has consolidated its domestic sales, parts, service and treasury operations. Nineteen men in the Northwest and Southwest division will move from San Francisco to Peoria. Field and district representatives will remain in their present locations. The new organization will become effective in January, 1960.

## Associations

**Construction Industry Manufacturers Association:** Another CIMA bureau, the Bucket Manufacturers Bureau, was approved by the board of directors at their September meeting. At the first meeting of the new board Charles J. Polinek, bucket division sales manager of Erie Strayer Co. was elected chairman, and W. H. Botten, vice president of the Owen Bucket Co. was elected vice-chairman.

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## 4-cycle...Short-stroke Air-cooled

- Conservatively rated, reliable. Kohler Co. has manufactured internal combustion engines for 38 years.
- Short stroke gives more usable power, cuts engine friction.
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- Balanced crankshaft—ball bearings at both ends.

- Rugged construction—plenty of load-lugging power.



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Riding Tractors  
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Lawn Rollers • Cultivators • Grain Blowers • Milkers • Grain Elevators  
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# A profile on the H. J. Williams Co., Inc. . . how it grew of earthmoving, highway and bridge construction

■ What are the ingredients of a successful construction contracting operation? Let's look into the facts surrounding the H. J. Williams Co., Inc. of York, Pennsylvania, and see how and why it grew into a top contracting organization.

H. J. Williams Company has a solid foundation that dates back to the early 1920's when Mr. H. J. Williams left the Hostetter Co. and went into business for himself. The two prime ingredients that contributed to his success and fine reputation were tremendous drive and pride of workmanship. By 1930, the firm was incorporated and Mr. Williams remained as president of the organization until his death in 1956.

From its beginning, this contractor specialized in earthmoving, bridge, and highway work . . . both federal and state. One of the features of the organization's operation is that it does practically all of the work itself on each project, with very little work sub-contracted. In the early days Williams bought a piece of equipment at a time and rented it out. This was an integral part of the business and the means by which he expanded his earnings, equipment inventory and contracting operations. Gradually, the work received demanded all of Williams' equipment, and the rental operation was discontinued.

## Mobility of operations important

The problems of administration, management and direction are more complex when contractors work large distances from the central offices. H. J. Williams has a subsidiary company, West York Construction Company, that primarily does public utility work in and around York, Pennsylvania. Although H. J. Williams is based in York, Pennsylvania, their operating area today covers projects in Maryland, West Virginia, and Virginia in addition to Pennsylvania. This reflects the mobility of the firm to work in diversified locations. It also reflects the firm's ability to coordinate manpower and machinery into working forces in widely scattered areas . . . demanding a wide variety of equipment, materials, and skills.

## Averages \$4 million of construction a year

Contractors doing \$1 million or more a year number around 3,500. H. J. Williams has long been a member of this group, having averaged \$4 million of construction a year over the past five years. A team of top management and supervisory personnel plays an important role in turning plans into millions of dollars of completed construction a year. The permanent staff numbers 225 people and at peak of operations the payroll is as high as 650 in total.

## Young leadership important to Williams' growth and success

Morgan Cousler, presently Vice President and Treasurer has been with the Williams organization since its beginning in 1920 . . . and one of the key men in its growth and progress. Mr. Cousler served as president from 1956-58 following H. J. Williams death. In early 1959, Robert E.

Hirschman was appointed president. He recognized the need for young leadership to keep up with the fast pace and highly competitive nature of the contracting business. The top management team who have played important parts in the company's operation and on whom the company's direction and success rests are: Robert E. Hirschman, president; Morgan E. Cousler, vice president and treasurer; R. A. Gingerich, ass't secretary; R. B. Bartell, v.p. eng'r; R. L. Cooley, v.p. machinery; D. E. Dietz, v.p. construction; H. A. Thatcher, v.p. eng'r; F. M. Chapman, v.p. general construction.

## Equipment an important part of contractor's success

An earthmoving, bridge and road builder like H. J. Williams Co. requires heavy equipment of all types. While an average of \$4-5 million of construction has been produced annually by this contractor . . . its current equipment inventory has the capacity to produce \$8 million of construction. Williams' major equipment, which is valued at approximately \$3 million, consists of the following:

- 17 air compressors — (Ingersoll-Rand)
- 1 rock drill — (Ingersoll-Rand)
- 10 automobiles — (all makes)
- 9 road graders — (Caterpillar)
- 6 Gradalls
- 2 concrete pavers — (Rex)
- 7 front end loaders — (Hough, Case)
- 7 stone spreaders — (Barber-Greene, Jackson)
- 23 rollers — (Buffalo-Springfield)
- 27 pumps — (various makes)
- 10 saws
- 19 scrapers — (Caterpillar, Euclid)
- 13 shovels — (Bucyrus-Erie, Marion)
- 31 tractors — (Caterpillar)
- 9 trailers
- 17 bottom dumps — (Euclid)
- 12 end dumps — (Euclid)
- 23 small dumps — (Chevrolet, Dodge, GMC)
- 19 pickups — (Chevrolet, Ford)
- 2 station wagons
- 9 stake trucks — (Chevrolet, Ford)
- 5 panel trucks
- 24 truck mounted welders, compressors, lubricators
- 4 truck cranes — (American)
- 13 two-way radios — (Motorola)



\$6.3 million highway project. 8.1 miles in length. Required 3.3 mil. cu yds of excavation, 295,000 sq yds concrete pavement, 160,000 barrels of cement, 88,000 lineal ft of concrete pipe, 1.7 mil. pounds of reinforcing bars for bridges, 1.2 million pounds of structural steel. 179 pieces of equipment were required for this project.

it grew to \$4 million  
 construction a year

### \$300,000 invested in new equipment annually

In order to maintain the most efficient construction operation, H. J. Williams is constantly on the lookout for the latest in equipment. Some \$300,000 is spent each year for new and replacement equipment. And to maintain its equipment and limit downtime to a minimum, this contractor invests \$250,000 in maintenance . . . with heavy emphasis on maintenance at the site of the project.

### Many influence purchases in H. J. Williams contracting operation

This contractor's operation requires the specialized knowledge and experience of many men in many different phases and locations of its work. This factor, coupled with the large expenditures for equipment and materials each year, makes it necessary for many of the key men to influence purchases, directly or indirectly. Here's what Mr. Hirschman, president, says:

"There are many influences on purchases of equipment and materials in our operation. The extent of purchasing influences within the organization by different individuals with various titles depends on the size and type of equipment involved. We get specific requests from our project managers and other supervisory personnel. Often we have meetings to discuss recommendations and needs and then make our decision. It's a team operation. It is impossible for one or two men to control purchases. The experience and know-how of men in our organization *must* be taken into consideration if we are to make the wisest purchases."

According to top management, this kind of thinking and operation helps to strengthen the firm's efficiency and overall teamwork.

### Key men in construction subscribe to CONSTRUCTION METHODS magazine

An important and necessary source of new techniques, product information, and education for key personnel in



Pennsylvania Turnpike, Northeastern Extension. Value of project, \$2.9 million. Required 3.6 miles of work including seven structures and reinforced concrete pavement of 95,000 square yds. Some of Williams paving equipment shown in operation.



Robert E. Hirschman

Morgan E. Cousler

**ROBERT E. HIRSCHMAN**, President, H. J. Williams . . . a subscriber to CONSTRUCTION METHODS magazine since 1949 says:

"The importance of Construction Methods in our business is evidenced by the fact that we have forty-five paid subscriptions. We want our men to be up to date on new methods, new equipment and new ideas in the construction industry. Construction Methods is also used as a buying guide for both materials and equipment. Your magazine provides the best overall educational result for our employees of any construction magazine."

**MORGAN E. COUSLER**, Vice President and Treasurer of H. J. Williams . . . a subscriber to CONSTRUCTION METHODS magazine since 1920 says:

"When this magazine started we recognized its significance. I have been cutting out articles and filing them by subject for over 25 years. I make a practice of reading the ads, too, for new machinery or materials which might be useful in our work. We want our men to read and learn what other contractors are doing, keep abreast of new methods and techniques. If our men didn't read and study from a magazine like CONSTRUCTION METHODS, we wouldn't want them on our payroll."

the H. J. Williams Company is CONSTRUCTION METHODS magazine. Mr. Cousler, vice president and treasurer, says:

"If our men didn't read articles and study from magazines like CONSTRUCTION METHODS, we wouldn't want them on our payroll."

This statement reflects the kind of thinking by top management in one of the nation's top contracting firms. H. J. Williams recognizes the importance and value of CONSTRUCTION METHODS to 45 of its key personnel who subscribe to it.

Advertisers, too, recognize the value of this publication in reaching important contracting firms like H. J. Williams (and its key personnel) across the nation.

# Construction Methods

AND  
 EQUIPMENT



A MCGRAW-HILL PUBLICATION

330 WEST 42nd STREET, NEW YORK 36, N. Y.

# OVERLAID PLYWOOD "COST PER USE"



**FINAL LINK: NIMITZ FREEWAY**  
Market to Fallon Streets  
Oakland, California

**DESIGN & ENGINEERING:**  
Bridge Department, Division of Highways,  
California Department of Public Works

**CONTRACTOR:**  
Johnson, Drake & Piper, Inc.  
Oakland, California

# FORMS GIVE LOWEST ON ELEVATED HIGHWAY

**High density overlaid plywood concrete form panels give over 50 re-uses, cost less than .007¢ per sq. ft. of form per pour.**

"THE EXTRA RE-USES we got from overlaid plywood more than offset its greater initial cost," says George Krenkel, project manager for Johnson, Drake & Piper, Inc., contractors for this 1.55-mile long 8-lane elevated highway.

"Even after giving upwards of 50 re-uses, a large percentage of the panels were salvaged for additional use on other jobs," Mr. Krenkel reports. "Besides being more economical in terms of cost per use, overlaid plywood creates much smoother concrete and is easier to strip and clean."

On the job over 50,000 sq. ft. of  $\frac{5}{8}$ " overlaid plywood was used for deck slabs, columns and guard rails. Pre-built 8' x 20' and 8' x 22' deck forms were supported by ingenious prefabricated shoring towers which were leap-frogged as pouring progressed. Screw jacks were used to raise towers to required heights. Stripping was accomplished simply by lowering jacks until the forms came free.

In carefully planned sequence of operations, prefabricated shoring towers were positioned, screw-jacked to required height. Deck form sections were then crane lifted into position.



## DOUGLAS FIR PLYWOOD ASSOCIATION

TACOMA 2, WASHINGTON

— a non-profit industry organization devoted to research, promotion and quality control

**HIGH DENSITY OVERLAID FIR PLYWOOD** is a premium concrete form panel intended for jobs that require ultra-smooth concrete surfaces and/or many re-uses (up to 200 re-uses may be obtained with properly designed and constructed forms). Base panel is EXT-DFPA® Exterior plywood.

Standard concrete form grades are: *Interior PlyForm®* with water-resistant glue for multiple (up to 10-12) re-uses; *Exterior PlyForm®* (waterproof glue) for up to 25 or more re-uses.

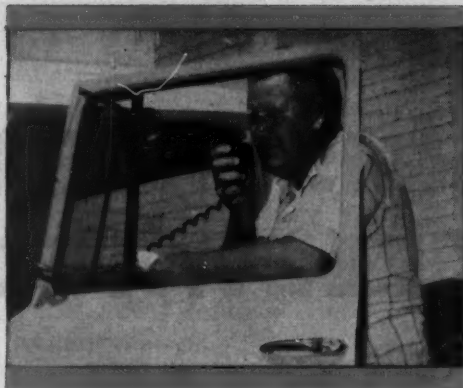
RESIN-FIBER OVERLAY

... PERMANENTLY  
FUSED TO  
EXTERIOR PLYWOOD

Mr. Albert Isbell, Shop Superintendent, says:

**"We solved  
our bearing  
problems  
10 years ago  
...with**

**CLEVITE 77!"**



The Isbell Construction Company owns and maintains over 1500 Diesel units operating in temperatures ranging from 40° below zero to 130° above—from 1000 to 9000 ft. elevation—all in heavy construction work—and giving longer service with trouble-free CLEVITE 77 bearings.

Covering five western states, Isbell specializes in mining construction and general heavy construction. The job shown is a U.S. Highway 60 widening and aligning job, south of Salt River Canyon. They have been getting as much as 8,000 hours on Diesel engines before overhauls. Albert Isbell says: "We had trouble with bearing performance ten years ago. We had to have a bearing that would stay on the job—we found it in Clevite 77. Now, we use nothing else."

Fleet operators and engine rebuilders everywhere have learned that Clevite 77 bearings are the highest duty bearing available—anywhere. Patented tri-metal construction makes possible more corrosion-resistance, greater fatigue strength, superior running surface.

On your next engine overhaul—specify the best—specify Monmouth Clevite 77 bearings—available at all N.A.P.A. jobbers.

**Monmouth**

**ENGINE  
BEARINGS**

CLEVITE SERVICE: Cleveland Graphite Bronze • Division of Clevite Corporation • Cleveland 3, Ohio



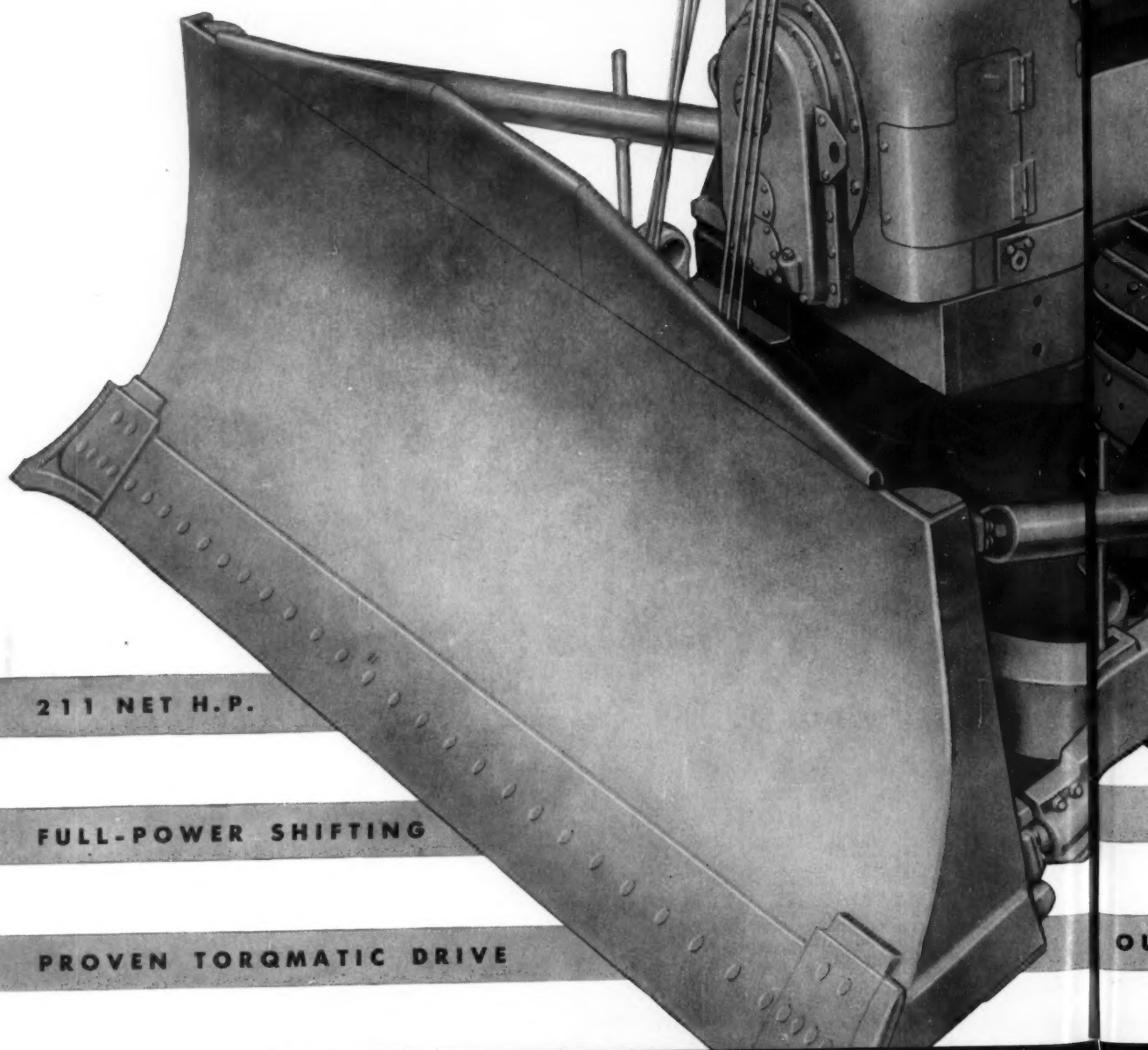
The words Monmouth, Clevite and Micro are registered trade marks of Clevite Corporation.

**EUCLID**

***PRESENTS...***

**THE "EUC"**

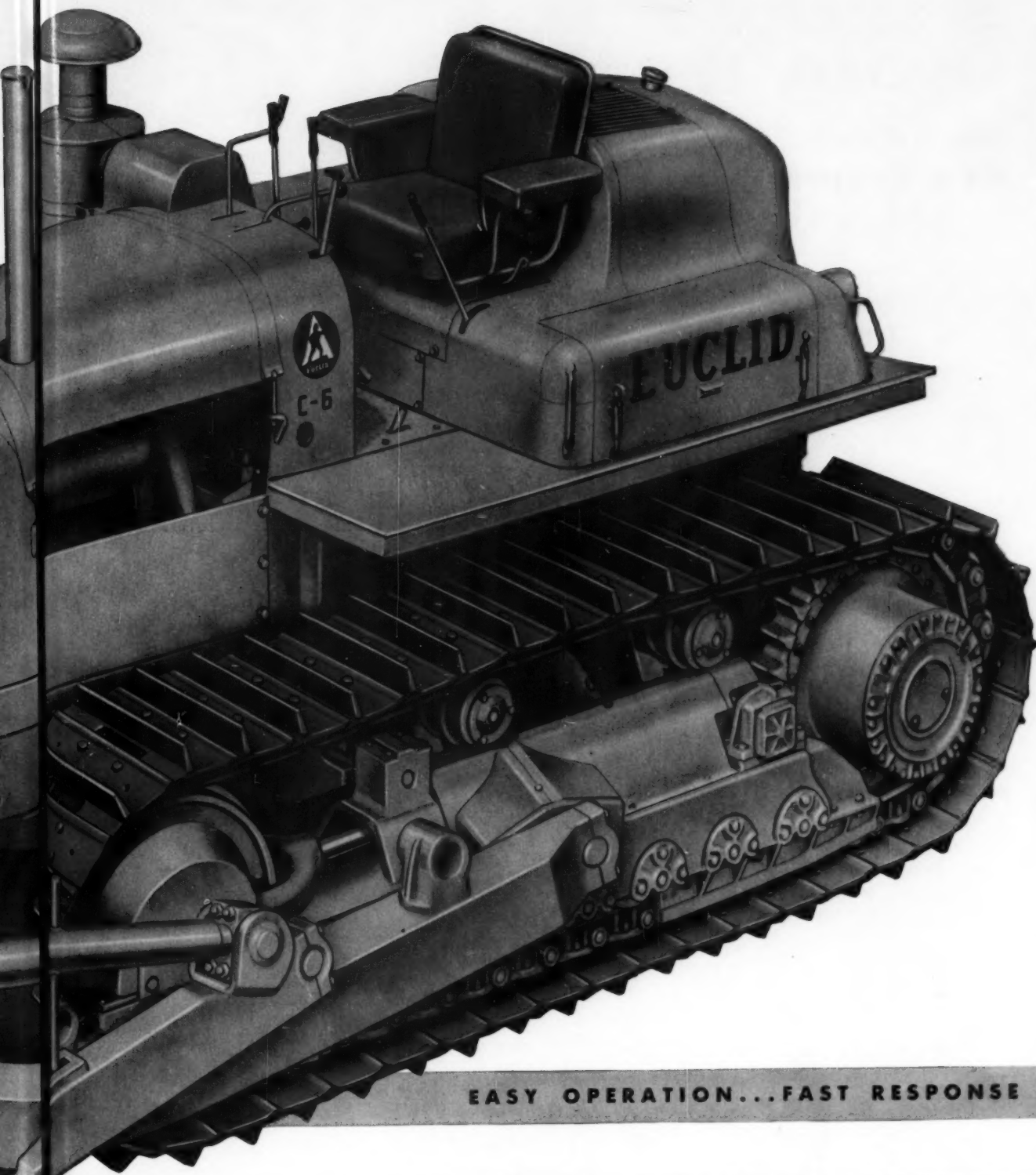
**C-6**



**211 NET H.P.**

**FULL-POWER SHIFTING**

**PROVEN TORQMATIC DRIVE**



**EASY OPERATION...FAST RESPONSE**

**INDEPENDENTLY SUSPENDED FINAL DRIVE**

**OUTSTANDING ACCESSIBILITY...EXCELLENT MANEUVERABILITY**

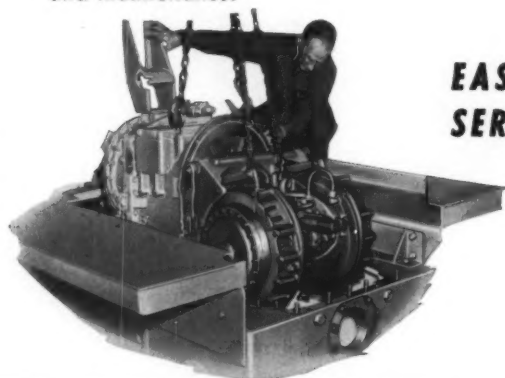
# 5 YEARS UNDER TEST...

***the "EUC" C-6 provides  
New Crawler Standards***



Proved by over 5 years of rugged field test . . . in mines, quarries, heavy earthmoving and logging as well as on the proving grounds. With 211 net hp. and proven Torqmatic Drive, the C-6 features full power shifting and time-saving maneuverability . . . has plenty of power and speed for dozing, ripping, pushloading scrapers and all other big tractor work.

Operators report that excellent visibility and over-all ease of handling give the C-6 smooth performance that gets more work done every shift . . . and with less downtime for service and maintenance.



## **EASY SERVICING**

Maintenance designed—the C-6 has exceptional accessibility and all major components are "out in the open"—easy to get to. For example, the engine is easily serviced or removed, and the converter, transmission, steering brakes and clutches assembly can be removed as a complete "package" without major disassembly . . . final planetary drives can be serviced without removing sprockets or breaking track . . . there are considerably fewer lube points than in competitive tractors.

***Have your Euclid Dealer give you the performance facts  
that prove the C-6 assures a better return on investment***



**EUCLID** DIVISION OF GENERAL MOTORS  
Cleveland 17, Ohio

EUCLID (GREAT BRITAIN) LTD.  
Lanarkshire, Scotland

*... a complete line of equipment for heavy earthmoving, mining, logging and many industrial operations ...*

## **Tuition Supplements — One Good Way To Help Our Colleges And Universities**

The business community has made an impressive start in going to the desperately needed financial aid of our colleges and universities. Business contributions to higher education have increased from only \$40 million in 1950 to \$136 million in 1958.

**This rise in financial aid to higher education should be a great source of satisfaction to the business community. But it goes only part way toward meeting the growing needs of colleges and universities for financial help.** Over the next ten years business aid to our privately supported colleges and universities alone must increase to at least \$500 million a year merely to provide decent faculty salaries and meet the increased operating costs of taking care of enrollments that will almost double.

One pervasive reason why many business firms have not joined the ranks of the companies contributing to higher education seems to be that, in the interest of prestige and public relations, they are making their provision of aid contingent upon finding some particularly novel way of providing it. So long as this point of view persists, business aid will lag, for there are simply not enough ways of providing financial aid that are both notably novel and sensible.\*

### **How The Plan Works**

There are, however, some well-tested ways of providing aid which improve rather than fade

in appeal with more using. One such way is the making of supplemental tuition payments to colleges and universities at which a company's employees take courses.

Many companies have scholarship or tuition-refund programs which cover all or part of the costs to their *employees* of taking college courses. But, in most colleges and universities, tuition charges fall far short of covering the full cost of the education given. By making an unrestricted "cost-of-education" grant a part of their employee scholarship or tuition-refund plans, these companies could make a material contribution toward covering the *college's* full costs as well.

The tuition supplement can be a fixed amount or a percentage of the tuition charged. Some plans provide for supplements as high as 100% of tuition, though there is usually an upper limit to the total supplemental payment given for each employee enrolled in the institution.

The plan seems to have originated with the Ford Motor Company Fund. When we at McGraw-Hill first learned of it, it appealed to us as having so many advantages, and so few disadvantages, that we adopted it as one part of our own program of financial aid.

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\*The efforts of the McGraw-Hill Publishing Company to find a suitable method of aiding higher education prompted the writing of a "more or less Socratic dialog" entitled *A Business Wrestling with the Problem of Aid to Colleges and Universities*. Copies of this pamphlet, which underlines the difficulty of finding both a novel and satisfactory method of providing aid, are available on request.

*continued on next page*

**HOW THE HEADS OF SOME OF THE INSTITUTIONS  
TO WHICH MCGRAW-HILL HAS MADE GRANTS FEEL  
ABOUT THE TUITION SUPPLEMENT PLAN**

"We are pleased not only because this addition to the never adequate supply of non-earmarked funds is a most welcome one, but also because it attests to the fact that the employees of our neighboring business firms are benefiting from the courses we offer at times convenient for them. We hope this mutually beneficial plan may continue and grow with the years."

*Grayson Kirk, President  
Columbia University*

"I shall take this occasion to express deep sentiments of appreciation, in my own name and in the name of the members of the Board of Trustees, for the very effective manner in which your corporation is aiding higher education by the payments made under your tuition supplement plan. Certainly your action is indicative of the fact that you realize industry and higher education must join forces to preserve the basic American system of free enterprise."

*Very Reverend John A. Flynn, C.M.  
President, St. John's University*

"The growing recognition by business and industry of the financial needs and important services rendered to the community by the colleges and universities is most encouraging, and Temple University is deeply appreciative of the fine support extended through McGraw-Hill's program of supplementary grants."

*Robert L. Johnson, President  
Temple University*

**The Plan's Advantages**

The main advantages of the tuition supplement plan are:

- **It is simple and easily administered.** Payments can be made when scholarships or tuition refunds are granted, or at another time convenient to the company.
- **It relieves the company of the difficult and sometimes disagreeable task of choosing one college rather than another.** The individual employee makes the choice.
- **It directly serves the interest of the company by encouraging and aiding the**

**institutions where its employees take courses.** In a sense, the company makes contributions in direct proportion to the value it receives in education for its employees.

● **It directly serves the interest of the colleges and universities receiving the grants by getting money to them in the form most appreciated—unrestricted funds to be used at the discretion of their administrators.**

Largely because tuition supplements are unrestricted as to use, this plan enjoys the unqualified approval and gratitude of the schools receiving such aid. This is not true of some of the other plans for granting aid to colleges and universities.

Tuition supplements, of course, can't be regarded as large efforts relative to the need of higher education and the responsibilities of business. But they are a very practical and useful first step, involving almost no problems. If you are not familiar with the idea of supplemental grants, why not discuss it with some of your friends in the field of higher education?

**The Price Of Novelty**

Our experience with tuition supplements indicates that this is an excellent plan, and we are glad to recommend it to other companies looking for an effective method of providing financial aid to higher education.

At any rate, we hope that business firms will not postpone granting financial aid until they find some novel way of doing it. If they do, it will be another case of too little and too late.

*This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.*

*Donald C. McGraw*  
PRESIDENT

**MCGRAW-HILL PUBLISHING COMPANY, INC.**



## Parts determine downtime costs

Few parts affect downtime costs so drastically as the bearing. For a single bearing failure can halt a key machine, bring production to a standstill—turn damage into disaster.

No other bearings producer can offer you as much experience in making bearings dependable as SKF, makers of the most complete line of ball and roller bearings.

Why not reduce your downtime costs by putting this experience to work today? Just call the nearest SKF office.

5912



# How AMSCO helps you MOVE

*Read why AMSCO Simplex Teeth and hardfacing are first choice of these users*

## **SIMPLEX TEETH STAY SHARP AFTER 20,000 TONS OF DIGGING**

At Victorville Lime Rock Co., Victorville, California, four Amsco Simplex 2-Part Reversible Teeth were installed on a shovel used in a stripping operation. Teeth previously used "lost their points" after digging about 18,000 tons of rock... and had to be replaced or rebuilt. The Simplex Teeth have already dug over 20,000 tons. Paul Keating, Quarry Superintendent, expects to get at least 25,000 tons before changing teeth.

Wright Smith, operator of the strip shovel, is equally enthusiastic about Simplex Teeth. He says they can lose

more than 2" due to wear, and still hold their points. This means lower cost operation and fewer shutdowns for maintenance. Old-style teeth had to be sent out for welding when worn down a couple of inches.

Victorville Lime Rock Co. produces a pure white lime rock used as an extender or filler in paints, plastics, floor tiles, rubber, ceramics, etc. They operate a 100 ft. deep quarry, and plan to switch to Simplex Teeth on their other production shovels, too, in order to save on maintenance costs.

AT  
VICTORVILLE  
LIME ROCK  
CO.

## **AMSCO HARDFACING ELECTRODES PROVE BEST FOR BUILD-UP JOBS**

"Amsco AW-79 wire doesn't twist and gives an excellent, uniform bead" —says Peter Agresta, partner in Bay Contractors Welding Service, El Cerrito, California. He also adds that AW-79 gives service life equal to, or better than, any wire they've ever used.

As a result, Bay Contractors uses Amsco AW-79 (a highly quality-

controlled tubular rod) for just about every type of build-up job... except where surfaces require machining.

For example, they use it for build-up of diesel switcher wheels... crawler tractor rollers and idlers... shovel rollers and front take-up rollers... house carrier rollers... sheaves... cutting edges on all alloyed blades.

AT BAY  
CONTRACTORS  
WELDING  
SERVICE

### **For further information:**

**SIMPLEX TEETH** — see your power shovel equipment dealer, or write Amsco for technical bulletin.

**HARDFACING ALLOYS** — see your Amsco welding distributor, or write direct for Condensed Catalog and Price List.

# AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis

In Canada: Joliette Steel and Manitoba Steel Foundry Divisions


Welding products distributed by Canadian Liquid Air Co., Ltd.

AMERICAN

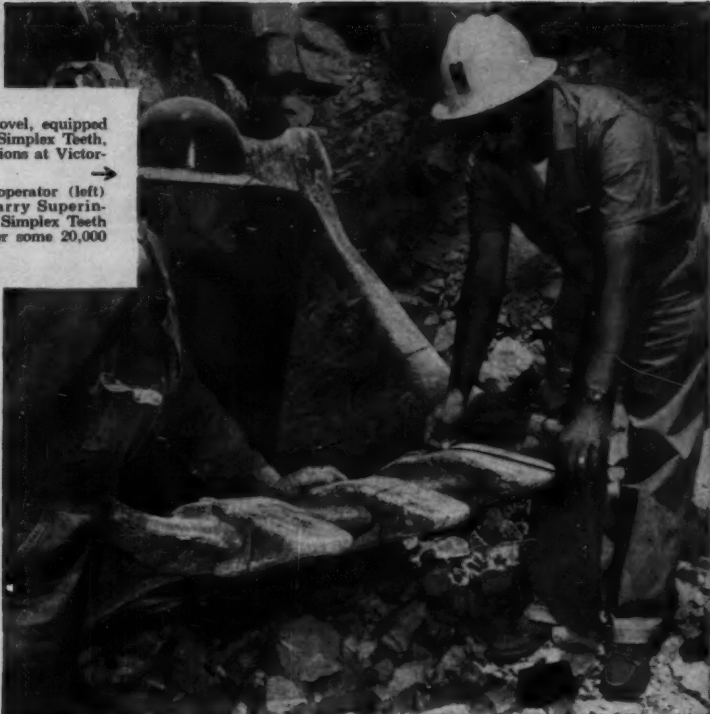
**Brake Shoe**

COMPANY


# MORE TONS PER DOLLAR



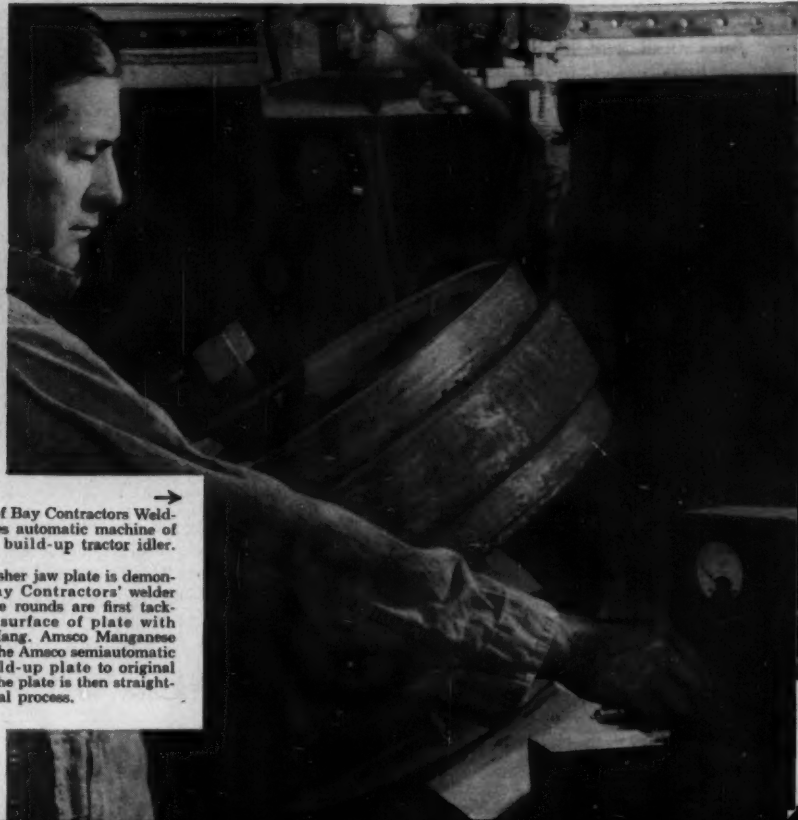
← Northwest Model 6 shovel, equipped with Amasco dipper and Simplex Teeth, used for stripping operations at Victorville Lime Rock.



→ Wright Smith, shovel operator (left) and Paul Keating, Quarry Superintendent (right) examine Simplex Teeth on Amasco dipper...after some 20,000 tons of digging.



→ Peter Agresta, of Bay Contractors Welding Service, uses automatic machine of own design to build-up tractor idler.



← Build-up of crusher jaw plate is demonstrated by a Bay Contractors' welder... Manganese rounds are first tack-welded across surface of plate with Amasco Nicro-Mang. Amasco Manganese Rod is used in the Amasco semiautomatic machine to build-up plate to original cross-section. The plate is then straightened by a special process.

# Construction Equipment News...



## World's Biggest Concrete Paver

A three-compartment drum on this paver mixes aggregate, cement, and water to produce concrete at the rate of 172 yd per hr. Based on a 60-sec mixing time, one cycle requires only 29 sec as compared to the 42-sec cycle of Twinbatch models.

Automatic controls of the electronic batchmeter simplify operation of the Koehring 34E Tribatch. Safety devices prevent one mixing function from

starting until all preceding functions have been completed. Also, the discharge chute will not open until the bucket is in position to receive the material.

Standard equipment includes a 37½-ft boom and spreading bucket, a water measuring device, a 1,200-gal storage tank, and a charging chute. A 219-hp GM diesel powers the paver.—Koehring Div., Koehring Co., 3026 W. Concordia, Milwaukee 16, Wis.

## High-Tonnage Market Is Dodge Aim for 1960

Gross combination weights on 1960 Dodge trucks have been boosted as much as 11,800 lb and range to 76,800 lb. Increased gross vehicle weights range up to 53,000 lb.

Increased weight rating along with a choice of four diesel engines is aimed at reaching the high-tonnage truck market. In the past this market was not available to Dodge.

The four Cummins diesels cover a horsepower range from 175 to 220. The 175-hp engine is turbocharged while the others are naturally aspirated. Eleven gasoline engines complete the line of available power plants. These range in size from 113 hp to 228 hp and include 6's and V-8's.

The complete line of trucks consists of 140 basic models including cab-forward, four-wheel-drive, forward-control, and tandem models. Thirty stake and platform trucks are offered in nine basic models from ½-ton through 2-ton sizes. Pickups are available in ½, ¾, and 1-ton sizes. Either 6-cyl or 200-hp V-8 engines power these units.



A unique design feature permits the front fenders to swing out 110 deg exposing engine components and accessories for maintenance. This permits access to the steering linkage and housing, generator, distributor, spark plugs, air cleaner, oil dipstick,

radiator filler, battery, and horn.

Available power trains include five and ten-speed units, auxiliary transmissions, and a six-speed Torqmatic transmission with a built-in hydraulic retarder.—Dodge Div., Chrysler Corp., Detroit, Mich.



### **Operator Has It Easy On Steel-Wheel Roller**

Power steering, grouped controls and instruments, accessibility to all components, and a wide platform with a safety guard rail make the operator's job easy on this Browning steel-wheel roller. The machine's low silhouette also gives the operator good visibility while rolling.

The BMCO three-wheel roller is available in three models. The weights are 6-8, 8-10, and 10-12 tons. A torque converter is standard equipment.—Browning Mfg. Co., 111 Humble Ave., San Antonio 6, Texas.

### **Versatile Belt Loader**

Loading windrows of loose material, stripping top soil in place, and trenching out for road widening are no problem for this belt loader. Curved gathering wings maintain ground contact for perfect clean-up.

The Ulmac U-300 loader is designed as an attachment for Caterpillar graders. A 56-hp Wisconsin engine powers the 36-in.-wide conveyor. Discharge height varies from 11 ft 9 in. to 14 ft 6 in.—Ulmac Equipment Co., El Paso, Ill.

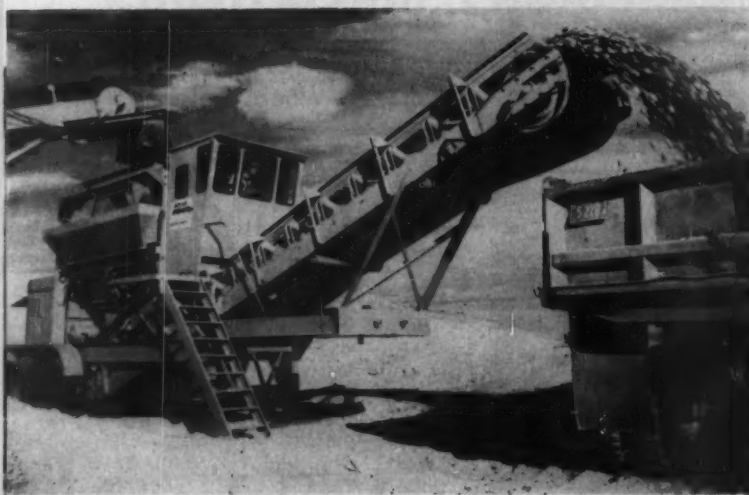


### **Electric Tree Crusher Clears 3 Acres an Hour**

This huge machine can clear scrub forest land at the rate of 3 acres per hr. It pushes trees to the ground smashing them into splinters with its heavy blade-studded rollers. The vegetation becomes a compressed mat that can be burned in place when dry.

The 95,000-lb machine is 37 ft long and 12 ft high. Each of its two rollers is 12 ft wide and 5 ft in diameter. A 400-hp diesel engine drives a generator that supplies the crusher's electric power. Electric motors drive each roller and power all other operating functions. Simple switches control the unit's operation.—R. G. LeTourneau, Inc., 2399 S. MacArthur, Longview, Texas.





### Bulk Materials Handler Weighs While It Loads

The Schrock Speed-Weigh mobile materials weigher can load 6 tons of gravel from hopper to truck in 10 sec. A three-man crew can set it up for operation in 1 hr. The weigher runs on rubber tires and can be hauled at 50 mph.

An electronic load-cell weighs materials with an accuracy of 0.5%. Failure in the operating cycle or the scale equipment automatically stops all operation until a correction is made.

Extensive use of T-1 steel in the hopper and gate liners increases service life and keeps the unit's weight to 30,000 lb. T-1 is a high-strength steel developed by the U.S. Steel Corp.—Western Conveyor Co., Boise, Idaho.

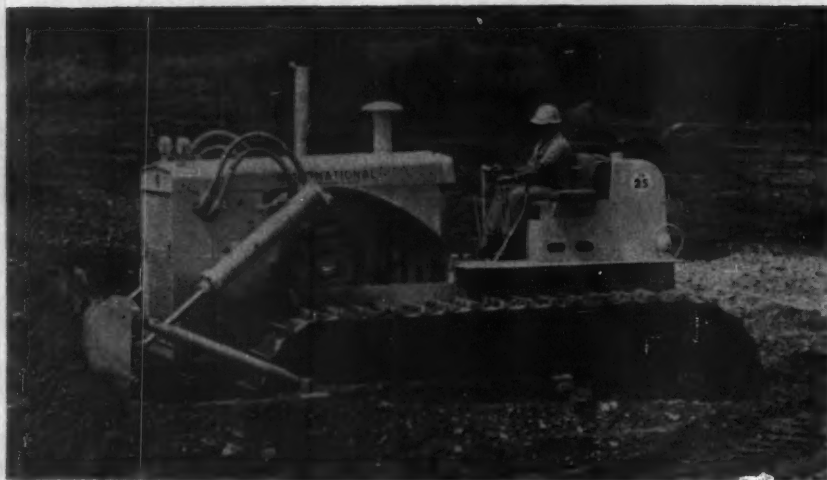
### 480 Models of Ford Trucks Cover the Field for 1960

Ford's 1960 trucks are designed to meet practically every trucking need from the small pick-up operations to heavy off-the-road hauling. A total of 480 models cover gross vehicle weights ranging from 4,600 lb to 51,000 lb. Gross combination weights are as high as 76,000 lb.

Seven V-8's and one 6-cyl engine are available in horsepower ratings to suit individual trucking needs. Three new front axles and six rear axles, in either single speed or two speed versions, are available for heavy trucks.

Light trucks are equipped with a locking-type differential that improves traction on slippery or muddy roads.

Electric pumps supply fuel to the big engines. The pumps are submerged in the fuel to eliminate the possibility of pumping vapor.—Ford Motor Co., P. O. Box 608, Dearborn, Mich.




### New Crawler Tractor Has More Weight, Power

Most powerful tractor of the International Harvester line is the TD-25. Its power plant is the DT-817 turbocharged diesel engine. It is a 6-cyl, 4-cycle, direct-starting unit rated at 230 hp.

Two models of the TD-25 are available. One has a torque converter; the other features a gear drive. With torque converter, the tractor's operating weight is 46,000 lb, and the drawbar pull is 70,000 lb. This model has four speeds in both forward and in reverse.

continued on page 184



## More protection in depth from Liberty Mutual

**Accident victim gets quick help.** Liberty claimsmen stationed all over the U.S. know the contractor's operations and specific problems. Sometimes they live right on the job.

# How minutes make a difference in your costs of workmen's compensation

Every time an accident disables one of your employees, the cost is reflected in your workmen's compensation insurance rates. By preventing accidents — or lessening their impact when they do occur — Liberty's protection in depth helps you keep your rates down.

Speed is essential. Working out of 105 claims offices linked by teletype, Liberty claimsmen act fast to make certain an injured worker receives proper care and treatment. Medical specialists are rushed to the local hospital when severe injury requires it. A rehabilitation nurse begins her liaison among patient, doctor, patient's family and policyholder to plan a recovery program. Meanwhile, detailed claims investigation is started while the facts are fresh. Saving valuable minutes can save a life or a limb and also save compensation premium.

Fast, efficient claims medical services are only a part of Liberty's protection in depth. This advanced concept in business insurance also includes an occupational medical program and two rehabilitation centers to handle industrial accidents. A scientific research center tackles policyholder accident and loss problems, while 448 full-time safety engineers work to stop accidents before they happen.

To learn more about the many services of protection in depth, contact the Liberty Mutual office nearest you.

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### SAFE AND SURE WITH GENTEX INDUSTRIAL SAFETY HATS

Slings in Gentex Safety Hats use same design principle as slings in Gentex jet flight helmets . . . 6-pt. suspension, 3-layer crossover at crown. Rugged, Lightweight, polyethylene shell. Fully Non-conductive. Exceeds all Federal safety specifications. **MEN LIKE ITS COMFORT . . . THEY WEAR IT!** Handsome styling . . . wide range of colors in hat and cap models. Write for full specifications.



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## MAYO KOEPE HOISTS

. . . offer lower initial costs, greater day-to-day economy for tunnels and small mines.

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TUNNEL AND MINE  
EQUIPMENT

LANCASTER, PENNA.

## EQUIPMENT NEWS...continued

The gear-drive version weighs 45,500 lb and has a 46,700-lb drawbar pull. It has eight speeds in both forward and in reverse.

Steering and shifting is done with the IH Planet-Power system. It permits finger-tip steering with controlled power on both tracks. The system also enables the operator to shift instantly from one speed range to the next without interruption of power. One-hand hydraulic braking is another feature of the Planet-Power system.

Other components include a 24-gal cooling system with a gear-driven fan, a gear-driven externally mounted water pump, and an oil cooler. The TD-25 has a horizontally mounted dry type air cleaner, a 135-gal fuel capacity, and a 24-volt electric starting system.

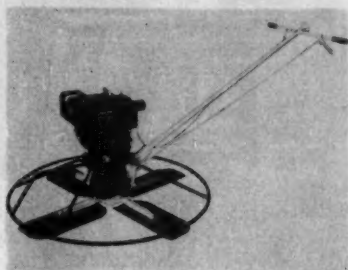
The crawler is 104 in. wide with standard 24-in. track shoes. Overall length is 196 7/8 in. With 24-in. shoes ground contact area is 5,652 sq in. Hydraulic or cable-controlled blades, pusher plates, and control units are available for the TD-25.—**International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill.



### Forced-Air Heater

It produces 100,000 Btu per hr or 600 cf of 350-deg air per min. This forced-air oil-burning heater is 43 1/2 in. high and weighs only 33 lb.

The blower unit may be purchased separately and installed on present HY-LO oil-burning salamanders for conversion into forced-air units.—**Scheu Products Co.**, 297 Stowell St., Upland, Calif.



### Power Trowel

The 430-G concrete troweling machine, largest of the Champion line, has a trowel diameter of 43 in. It is available in three and four-blade models. A dual retractable wheel assembly is optional.

The power plant is a 5-hp Briggs-Stratton engine. A safety grip controls the blades, automatically stopping rotation when the handle is released.—Champion Mfg. Co., 3700 Forest Park Ave., St. Louis 8, Mo.



### Three Lift Trucks

Three new Clark lift trucks are the CY-60, CY-70, and CY-80 with capacities of 6,000 lb, 7,000 lb, and 8,000 lb respectively.

Six-cylinder Continental gas or LPG engines power the trucks. A two-speed power shift transmission is standard; a three-speed manual unit is optional. Top speed is 12 mph. Power steering and hydraulic brakes are also standard. Either single or dual-tire drive wheels are available for the three lift trucks.

All controls for direction, lift, and tilt are mounted on the steering column. Hood over the engine is split for easy maintenance.—Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

## This PAYLOADER® is



## MORE than a tractor-shovel



**THE JOB:** This "PAYLOADER" with the Drott 4-in-1 bucket did an outstanding job, "saving time and operating costs," for Glenmar Construction Co. Inc., on a 16,000-ft. storm sewer on Maryland State Route 193... **loading** out excavated dirt unsuitable for backfilling... **moving** old curbing and large chunks of broken concrete... **carrying** up to 54" diameter concrete pipe into position for lowering-in... **bulldozing** and backfilling trench, plus leveling, grading and clean-up work.

"Best piece of equipment we have ever purchased" says Peter

J. Ellis, V. P. of Glenmar Construction Co. Inc., Rockville, Md. "It will move more dirt than any two competitive loaders that we have ever owned. We don't know how we ever did a job without it."

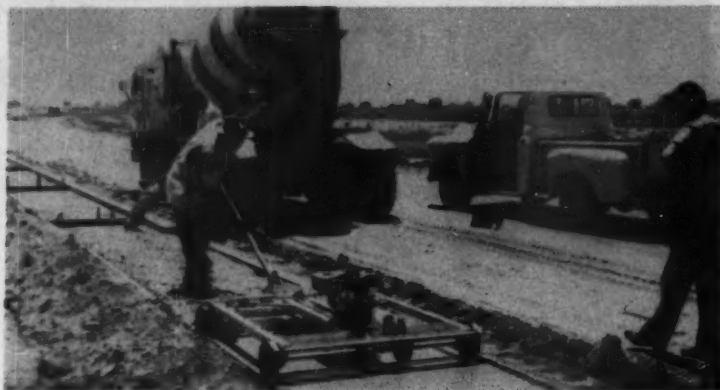
"Most useful machine I have ever used... I am using the H-70 with 4-in-1 in all phases of this contract," says Max Hutchinson, Glenmar's foreman. "The 4-in-1 versatility on rubber tires makes it the most useful single machine I have ever used in my 15 years of pipe work experience. Gives unlimited advantages that can't be determined until the need arises."

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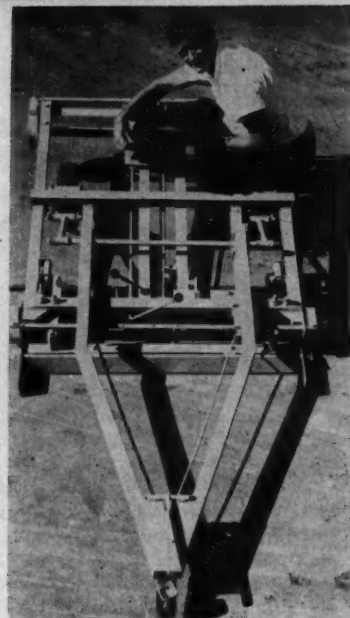


### Sidewalk Finisher Screeds, Tamps, Floats

The Jiggle-Bug is a self-propelled sidewalk finisher that combines screeding, tamping, and floating into a single operation. It takes two men to operate the unit. One man handles the concrete placing, the other feeds concrete to the machine.

Two parallel screed bars operate in a combination of lateral and vertical movements. A variable control governs the speed of the screed bar enabling the machine to finish concrete mixes of any slump. A gasoline engine powers the Jiggle-Bug, and a mechanical linkage moves the screed bars.

No special forming techniques



are required for the unit's operation. It will work on either 2-in. steel or wood forms. Stakes do not have to be cut level with the form. The machine covers sidewalk widths from 4 to 6 ft; it is adjustable in 6-in. increments.

The Jiggle-Bug weighs only 300 lb and can be transported easily. —Jones Mfg. Co., 4239 N. Seventh St., Phoenix, Ariz.




**HEY! YOUR SLIP IS SHOWING!**

And *your* slip is showing, too, when your crawler tracks start spinning.

But you can restore full pulling power to your worn grousers in less than 30 minutes in the field with MARQUETTE's Tractor Strip "retread."

And you can save 30% or more — up to \$400 — of the cost of a new set of grousers by using easy-to-weld Tractor Strip. Often, it lasts longer than original grouser bars! Sizes available to fit *all* tracks.

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# How to pick friction materials to get best performance from Drag Lines

A recent industry survey shows that 25% of the average contractor's bid price represents the cost of equipment maintenance.

Here's an obvious area of opportunity for you to convert costs into profits through good maintenance practices. And since improper friction

materials cause over half the premature failures in relined brakes and clutches—picking the right lining or facing should be the basic requirement of any maintenance plan.

As shown in the accompanying diagram of drag line shovel requirements, it is the mechanism's work

load that determines the characteristics of the controlling friction.

For example—for the swing friction which controls the momentum of the heavy cab and boom—you need a special material like J-M 150 to absorb the high torque effect. The engine clutch, on the other hand, receives sudden high rpm loadings, and requires a material like J-M 140 to withstand extreme thermal exposure.

To meet modern equipment requirements such as these, Johns-Manville Asbestos Frictions are supplied in two different primary classifications—molded and woven—with numerous style variations in each. The Molded Asbestos styles resist thermal breakdown and withstand heavy shock loads which tend to crush or shear materials. The Woven Asbestos styles—with easy adaptability and quick wear-in—have exceptional non-scoring properties and mechanical strength. All assure more service hours per dollar invested.

For expert counsel and advice on your friction needs, call on your nearby J-M Friction Materials Specialist. And for your own FREE copy of the J-M Industrial Friction Materials book—a comprehensive listing of types, styles and recommendations—write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario. Ask for FM-35A.



Recommended J-M Friction Materials for Drag Lines

**A. Swing Friction**—subject to extreme wear and high torque.—J-M 150 for high energy absorption, good rate of wear and non-fade characteristics.

**B. Hoist Friction**—receives heavy wear. Extreme loads require easy engagement and positive, non-slip holding.—J-M 140 for excellent wear characteristics and non-fading friction.

**C. Drag Friction**—subject to high impact and variable loading.—J-M 150 for high friction, and excellent frictional stability over wide temperature range.

**D. Swing Brakes, Hoist Brakes, Drag Brakes**—swing and hoist brakes are exposed to sudden shock loads while drag brakes receive intermittent loading.

—J-M 600 for easy seating, long wear and excellent holding characteristics.

**E. Travel Brakes**—most units require exceptionally long lining with good hold-

ing power.—J-M 300 or 600 Woven Roll Stock for ease of application.

**F. Boosters**—utilized on most equipment to assist mechanisms exposed to extreme loading or high torque conditions. Usually found next to mechanism they assist, boosters require a friction material that is fast seating and gives positive engagement.

—J-M 300 and 600 Woven Roll Stock for ease of application and size variety.

**G. Engine Clutch**—exposed to intermittent high torque, sudden shock loads and heat surge.

—J-M 140 for its ability to quickly dissipate heat and withstand shock loads, and its high friction stability.

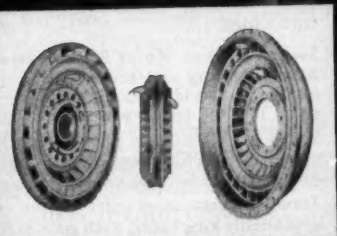
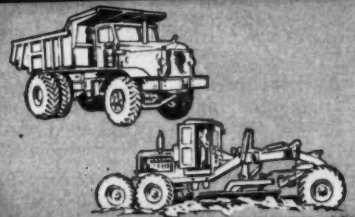


Molded J-M Facing Segments being riveted to a swing friction member.

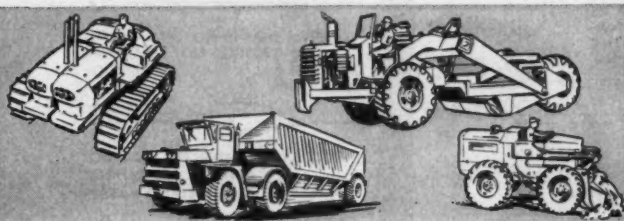
## JOHNS-MANVILLE



# What's it costing



# you to keep the clutch pedal?



**T**HE ACTUAL FIGURES are on your own cost sheets: Engine-disconnect clutch replacements at \$800 or more each year (plus expensive downtime)—too-frequent overhauls of overtaxed engines at \$1,200 to \$1,500 each—constant repair bills for shock-load-damaged axles and drive lines —\$1,500 to \$2,000 in equipment damage every time you train a rookie driver.

## What Can You Do About These Costs?

Now mark this: When your equipment has Allison TORQMATIC DRIVES, you eliminate these costs—or cut them to amazing new lows. Engine-disconnect clutch repairs are ended, so is shock-load damage. New drivers practically never make a costly shifting mistake. You save one engine overhaul out of three.

So you're money ahead no matter how good your present clutch-pedal equipment is—or how skillful the men who operate it. For TORQMATIC takes over the clutching job—adjusts power output to every change in load demand—protects your whole power train every working minute.

## Can You Afford to Pay the Penalty?

Can you afford, then, to pay the penalty of owning old-fashioned clutch-pedal equipment—especially when it means competing against other owners who looked past first cost and are now enjoying TORQMATIC savings?

Remember, no other heavy-duty hydraulic transmission has been so thoroughly battle-tested over the years. And you can get it in over 100 makes of equipment of most every type. See your equipment dealer—or write Allison for the full story.

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### Good Visibility Makes Operation Easy

Improved visibility makes operation of the Trojan 134 tractor shovel an easy job. The curved lift arms permit visibility to the sides even when the bucket is in the raised position. In addition, all instruments and gages are grouped on a central panel.

The 134 can lift 8,000 lb. Bucket capacities are 1, 1-1/3, and 1-2/3 yd. Dumping clearance under the bucket cutting edge is 8 ft 8 in. In the load-carrying position the bucket tips back 40 deg and rides just above the ground.

A larger model, the Trojan 164, is also available. Its lifting capacity is 10,000 lb. Available bucket sizes are 1-1/3, 1-2/3, and 2 yd. Dumping clearance of this model is 8 ft 6 in. under the bucket cutting edge.

Front bumpers are an integral part of the frame and protect the tractor shovel in case of contact with a truck or bin while dumping. Front lights are recessed to protect them from falling material. Panels in the hood shroud are removable and permit access to the engine and battery compartment for servicing.

Both models are available with either gasoline or diesel power. They are equipped with three-speed, power-shift transmissions and 3.5 to 1 torque multiplying torque converters.

The tractor's differential insures good traction by transferring power to the wheel with the best footing. Power steering is standard on both models.—Yale & Towne Mfg. Co., Trojan Div., Batavia, N.Y.

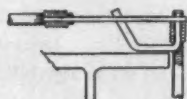
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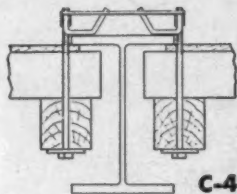
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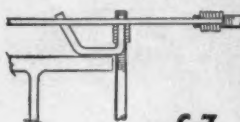
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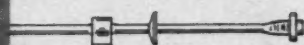
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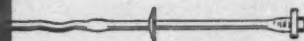
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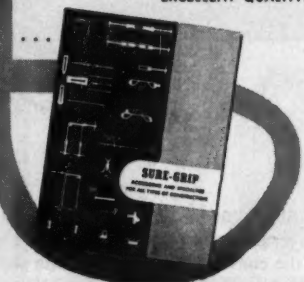
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EXCELLENT QUALITY.



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## GUARANTEES

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## EQUIPMENT NEWS...continued

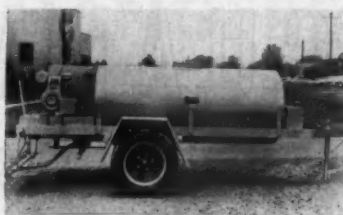


### Improved Tractor Shovel

Carry capacity of the Hough H-50 tractor shovel is 5,000 lb. It replaces the HU Payloader.

Either a gasoline or a diesel engine may power the unit. The engines are rated at 90 to 92 hp. A single-stage, two-phase torque converter is standard. The transmission has three speeds in either forward or reverse. Shifting up or down in either direction does not require foot clutching or stopping for a range shift. A power transfer differential is also standard.

Other design features include four-wheel drive, power steering, pry-out bucket action, and power-boosted brakes. — **The Frank G. Hough Co., Libertyville, Ill.**



### Distributors for Maintenance Work

A line of bituminous distributors consists of three units with tank capacities of 400, 600, and 800 gal. The SP-D-400P is mounted on a dual-wheel trailer. The SP-D-600P can be mounted either on a trailer or with skids for truck mounting. The 800-gal unit is available with a skid-mounted tank only.

The distributors utilize either circulating or non-circulating spray bars. The non-circulating bar is 4 ft long with optional 8-ft extensions. A 6-ft hand spray bar with handles for small patch work is standard. The hand spray hose is 15 ft long. Power plant is an 8-hp Wisconsin engine; a 15-hp unit is optional.—**Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J.**

## BOOK NEWS-NOTES

### ESTIMATING STRUCTURAL STEEL

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Just Published — A complete reference manual on route engineering practice, stressing the computations, tables, and formulas of greatest service to the field engineer in his layout of curves. Fourth Edition includes many new activities taking place in the National Highway Development Program, as well as important applications of aerial photography and electronics to highway planning and design. By Thomas F. Hickerson, formerly of North Carolina State Highway Commission. Fourth Edition, 561 pp. 138 illus., over 200 pp. of tables, \$8.50.

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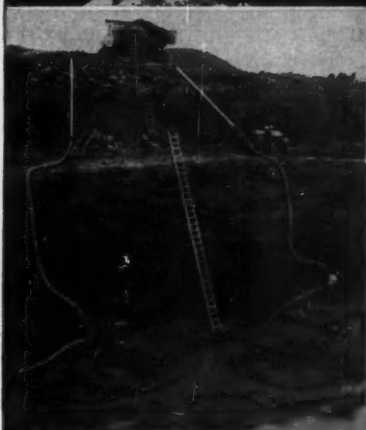
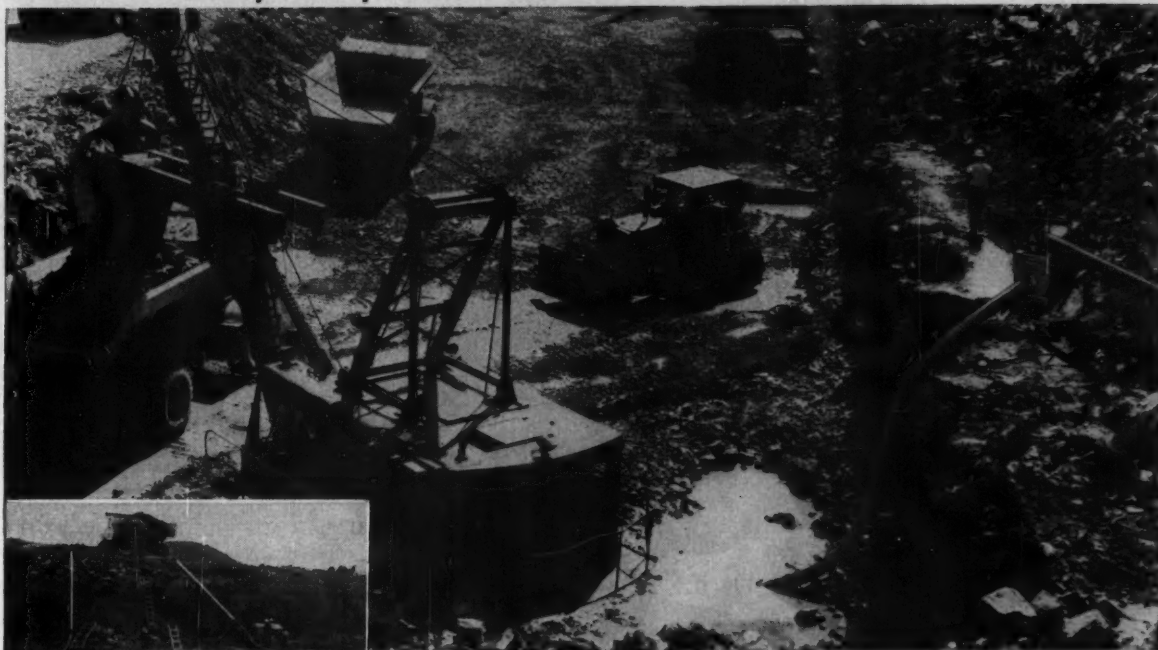
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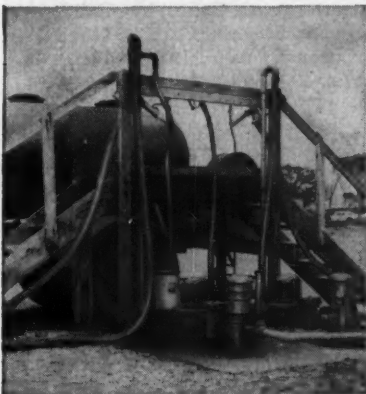
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# SEEPAGE WATER EFFICIENTLY CONTROLLED ON NEW \$700,000,000 NIAGARA POWER PROJECT



These engine-driven Marlow self-priming pumps operate on a 24-hour schedule in the trench excavation to control seepage water and keep it workable.



A tank truck which carries fuel to on-the-job vehicles and equipment is being filled by a Marlow vertical self-priming pump at a temporary loading rack.

## Marlows Operate Day and Night to Keep Conduit Trenches Workable

Four of the major contracts of the giant new Niagara Power Project are for the construction of a \$141,000,000 four-mile-long conduit waterways system. Before beginning construction, trenches were dug in four separate contract sections to accommodate two reinforced concrete conduits, measuring 46 feet wide and 66 feet high. These conduits will carry water from an intake on the upper Niagara north to the Tuscarora Pumping and Generating Plant.

When excavation was begun on Section I of the waterways, a cofferdam was built at the intake location three miles above the Falls to hold back water until the work was completed. When seepage became a serious problem, Merritt-Chapman & Scott Corporation installed big Marlow self-priming contractor's pumps to keep the

area workable. On another section of the waterways project, Gull Contracting Company and L. G. Defelice and Son, Incorporated, used Marlow Model 6E4 self-priming pumps in the trenches. Operated to carry water up and over a 75 foot embankment, these pumps have a capacity of 90,000 G.P.H. on continuous service.

In addition to a complete line of AGC rated self-priming centrifugal pumps, Marlow also builds the famous "Mud-Hog" diaphragm pump that handles muddy and trash-laden liquids. All these pumps are readily available from any of the strategically located Marlow plants. Look for the heading "Marlow Pumps" in the "yellow pages" of your classified telephone directory, or ask your Marlow dealer about the line of contractor's pumps.



**MARLOW PUMPS®**

DIVISION OF BELL & GOSSETT COMPANY

MIDLAND PARK, NEW JERSEY

Morton Grove, Illinois • Longview, Texas

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\*R. J. KRIZ, General Manager  
Field Testing Division

**"MOBILE B-52 PACEMAKER**  
travels 60 miles,  
samples 95 feet and returns ...  
all in 6 hours!"\*

Robert J. Kriz of Herron Testing Laboratories, Cleveland, Ohio says, "Since using the PACEMAKER with *Hollow Stem* in our foundation testing operations, we are producing more with three crews than we were with four of our conventional crews. Even on big jobs, one operator can keep two men busy sampling and recording."

Exceptional mobility of the hydraulic-powered B-52 PACEMAKER ... plus its ability to drill, bore, auger, diamond core and sample by any standard method ... can be key factors in profitable foundation testing and other subsurface drilling operations.

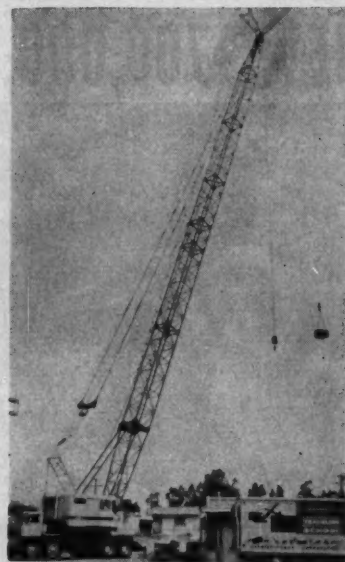
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## EQUIPMENT NEWS...continued



### Five Truck Cranes

Biggest of a line of five new P&H truck cranes is the 775A-TC. It can handle a 250-ft boom.

Booms up to 180 ft long are available for the 35-ton 555C-TC crane. The 565A-TC, with a 40-ton capacity, handles a 200-ft boom. Both the 50-ton 585A-TC and the 60-ton 595TC also can handle a 200-ft boom.

Swing power is transmitted electromagnetically through the P&H Magnetorque. It eliminates friction clutches, lining replacements, adjustments, and conventional clutch maintenance. The machines' gears are completely enclosed and run in oil. Only one oil change a year is needed.

All booms are of tubular chord and lattice construction. Boom material is T-1 steel. The crane carriers are built by P&H. — Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.



### Improved Tandem Roller

Improvements incorporated in the Essick 210 tandem roller include a lower profile, wider rolls, new steering arrangement, and a re-



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with Plug-in Transistor Circuit  
So good it's Guaranteed Forever!

Users of PM Transistor Neon or Incandescent Flasher Lights say: "They give better visibility ... require less maintenance ... and have four times greater bulb life, two times greater battery life, and 12 times greater lens life than other flashers—an extra job profit of \$3 per light per month for you." Adjustable flash rate, too!

Write for free demonstration. There's a PM Field Engineer near you.

**Pacific Mercury**

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Manufacturers of the Thomas Electronic Organ



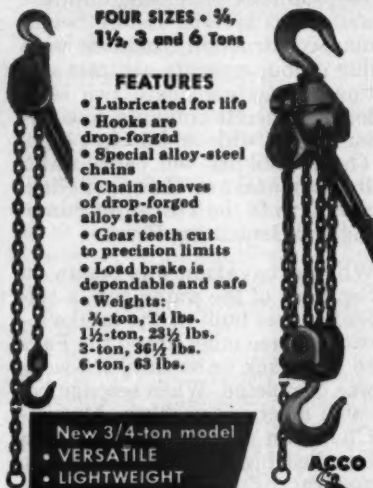
## NEW 3/4-ton Pull-A-Way

Added to **WRIGHT**  
TYPE 'C' LINE!

FOUR SIZES • ¾,  
1½, 3 and 6 Tons

### FEATURES

- Lubricated for life
- Hooks are drop-forged
- Special alloy-steel chains
- Chain sheaves of drop-forged alloy steel
- Gear teeth cut to precision limits
- Load brake is dependable and safe
- Weights:  
¾-ton, 14 lbs.  
1½-ton, 23½ lbs.  
3-ton, 36½ lbs.  
6-ton, 63 lbs.



New 3/4-ton model  
• VERSATILE  
• LIGHTWEIGHT

Write to York, Pa., office for complete information



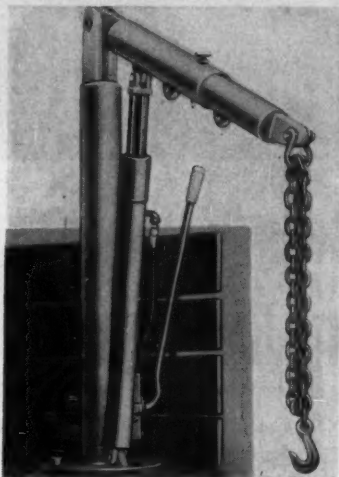
York, Pa., Bridgeport, Conn.

designed transmission. The 210 replaces the previous model 200.

The roller weighs from 1½ to 2 tons. Its compression roll exerts a pressure of 110 lb per lin in. There are two spring-actuated scraper blades on each roll. The sprinkler system consists of a 55-gal water tank and two individually controlled spray bars for each roll.

The redesigned transmission incorporates externally adjustable twin disc clutches. Sealed ball bearings on both rolls eliminate greasing in tight spots. Essick also builds a trailer, the 21 RT, for transporting the roller.

A 3-ton roller, the 310, is also available. It replaces the model 300. Improvements incorporated in this roller are similar to those on the 210. The 310 can be hauled on the 31 RT trailer.—Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.



### Unloads Trucks, Converts to Shop Crane

A small hydraulic crane helps unload trucks and converts to a portable or stationary shop crane. It's easy to move it from truck to truck or to different locations on a work bench or a loading dock. Base plates can be mounted on trucks and other strategic spots and a crane installed when needed.

The Ausco crane can be powered manually or electrically with a 6 or 12-volt battery. Lifting accessories include a sheave, motor block, barrel hook, and sling cross-bar attachments. — Auto Specialties Mfg. Co., St. Joseph, Mich.



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## SOLID POWER

### of a Remington concrete vibrator

You're looking at the business end of Remington's new Model EV-25 motor-in-head vibrator. Users say it's the best electric motor-in-head vibrator made, and Remington guarantees it for 6 months. The Model EV-25 is just one of 11 concrete vibrator models available from Remington. Ratings range from 1 to 6¾ hp in air, electric or gasoline-powered models. Interchangeable shafts, housings and heads enable equipment to be adapted to widely varying conditions. Mail coupon or write for performance data and specifications on the new Model EV-25 and the complete line of Remington concrete vibrators.

CHOOSE THE POWER MOST  
EFFICIENT FOR YOU. REMINGTON  
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AND POWDER ACTUATED  
MODELS

# Remington

Remington Arms Company, Inc., Bridgeport 2, Conn.  
IN CANADA: Remington Arms of Canada Limited,  
36 Queen Elizabeth Blvd., Toronto, Ont.



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CM-11

Remington Arms Company, Inc., Bridgeport 2, Conn.

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☐ Air Tools ☐ Flexible Shaft Machines ☐ Concrete Vibrators ☐ Chain Saws ☐ Stud Drivers

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Company \_\_\_\_\_

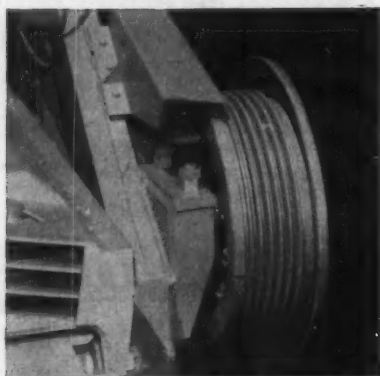
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**B.F. Goodrich**



## **B.F. Goodrich Hi-Torque Brakes help Curtiss-Wright operators scoop up profits**



Rear view of Curtiss-Wright Model CW-226 Scraper shows 26" x 7" B.F. Goodrich Hi-Torque Brake. Model CW-226 Tractor uses 22" x 7" size. Brakes for this unit are actuated with air-over-hydraulic master cylinders.

Why do so many big Curtiss-Wright tractors and scrapers (like the Model CW-226 shown above) rely on new B.F. Goodrich Hi-Torque Brakes?

For plenty of reasons: 1. Exclusive full circle stopping power enables the B.F. Goodrich Hi-Torque Brake to stop up to twice as fast as conventional two-shoe brakes. Operators boost job profits by hauling heaped payloads, running more cycles per hour. 2. B.F. Goodrich Hi-Torque Brakes stop smoothly, without fade, so operators can tackle terrain once considered unsafe.

Other factors important to the cost-conscious operator: 3. B.F. Goodrich

Hi-Torque Brakes adjust themselves automatically. 4. They need no lubrication. 5. Lining changes can be made with simple hand tools and a minimum of time. 6. Brakes can be operated by either air-over-hydraulic or direct-hydraulic actuation.

Rugged, dependable B.F. Goodrich Hi-Torque Brakes do a better stopping job on almost any kind of wheeled off-road vehicle. For more information, ask your dealer or equipment manufacturer, or write *B.F. Goodrich Aviation Products, a division of The B.F. Goodrich Company, Dept. CM-119, Troy, Ohio.*

# **B.F. Goodrich** *Hi-Torque brakes*

# Maintenance Shop

## New Life for Worn Track Assemblies

By R. M. STRATTON  
District Engineer  
The Lincoln Electric Co.

**REBUILDING** of worn crawler tractor rails, rollers, and idlers by application of weld metal can renew these parts to give at least 75% of their original service life. Where operations are primarily in sand, the service life of rebuilt components will match that of new ones.

Automatic precision welding machines operating on the submerged arc principle play an important part in rebuilding work. One such installation is now in operation in the shop of Carolina Tractor and Equipment Co. of Salisbury, N.C. This Caterpillar

dealer is engaged in extensive tractor rebuilding work.

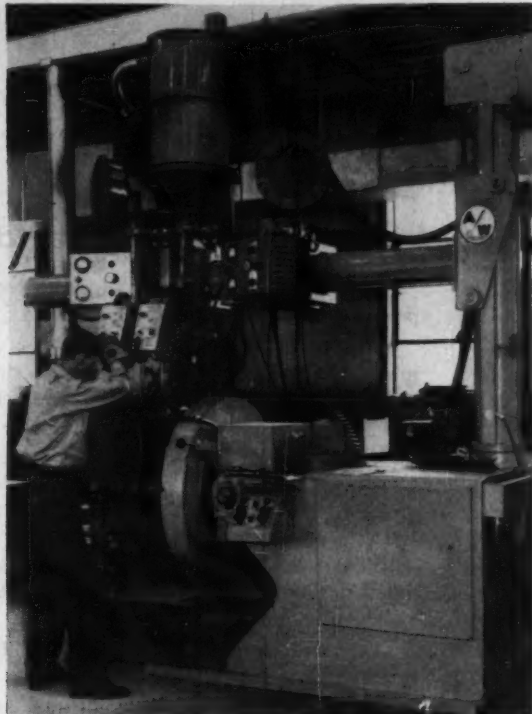
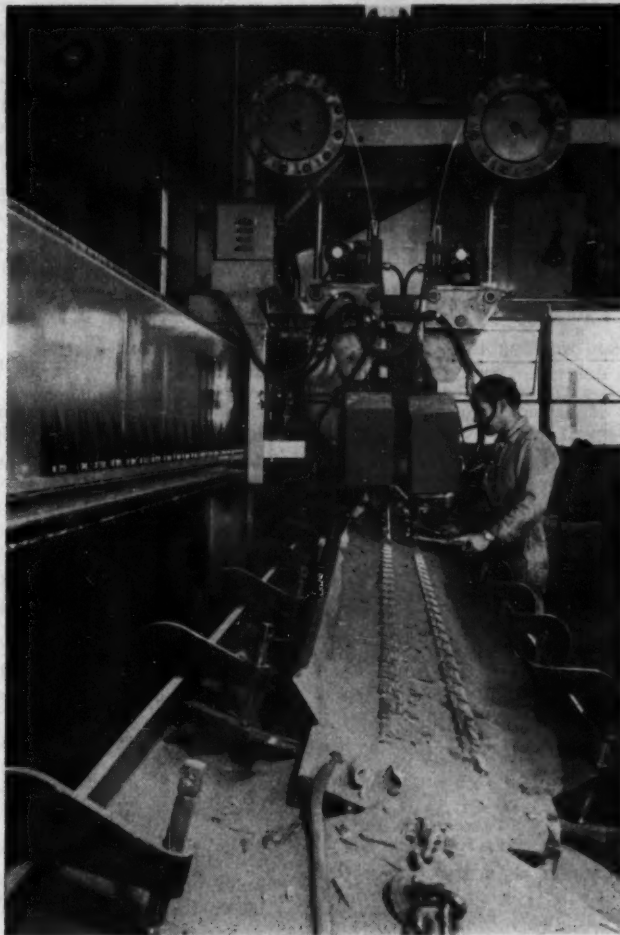
Two of the principal pieces of equipment are a twin-head Track-O-Matic rail rebuilder and a Multimatic universal roller and idler rebuilder. Both were built by the Automatic Welding Co. of Waukesha, Wis. They are equipped with Lincoln Electric welding heads, controls, and electrical accessories. The setup also includes four 600-amp motor-generator sets.

An unusual feature of the rail rebuilder is its 36-ft rotating table. It permits mounting an entire track rail assembly with or without shoes. C-clamps secure rails or tracks to the table top and maintain rigid alignment

while the twin welding heads move along a travel beam. Flux is deposited continuously over the arcs. In addition, flux is dumped over the rail prior to the start of welding.

The rotating table can be tilted to any angle for edge buildup—most rails usually develop considerable edge wear. Also, the table can be rotated a full 360 deg to permit the accumulated flux to fall out into shallow wheeled flux trays beneath it. The table is mounted on two trunnions with rotation manually controlled through a self-locking gear reducer.

With fully automatic stopping and starting of arcs at rail joints, one operator can complete a ¼-



**REBUILDS ROLLERS**—Automatic twin head welder resurfaces idlers and rollers. The chuck tilts to permit work on roller flanges without removing them from machine.

**TILTING TABLE**—The 36-ft table of the rail rebuilder tilts to any angle to simplify building up of worn rail edges. Entire rail assembly can be mounted at one time.

## MAINTENANCE SHOP... continued

in. buildup of one D8 tractor rail in less than 8 hr. This coincides with the standard working day and provides additional quality control because it is desirable to complete each track without interruption. The complete operation, including loading and unloading, takes approximately 12 hr.

The carriage has a variable-speed drive giving it travel speeds ranging from 4 to 90 in. per min.

The drive can be disengaged for free manual movement on the travel beam.

Large, screen-covered trays catch the discarded fused flux. An overhead hoist or crane picks up the trays to replace unused flux on the table. The flux is Lincoln Electric agglomerated H-535 in combination with L-60 mild steel wire.

Choice of these materials is based on the longer service ob-



**SIX AT A TIME**—Six rollers can be mounted at one time on the vertical table and indexed under the machine's welding heads.

## RAKING...FOR PROFIT



**YORK POWER GRADER RAKE**—  
For fast grading and raking. Fits all heavy-duty graders... folds out of way when idle.



**YORK MODEL RE RAKE WITH SCARIFIER**—  
This York combination speedily performs most landscaping and lawn-building jobs.

### York Rakes help you get more profit from grading and landscaping

Thousands of contractors are proving daily that YORK RAKES are profit-builders.

These rugged rakes will handle almost any soil-working and finishing job: rough grading... removing roots, stones, debris... spreading topsoil... pulverizing and mulching... terracing... building road shoulders and malls... spreading crushed stone and gravel.

**YORK RAKE, MODEL PG** attaches to most heavy-duty motor graders, doubles the efficiency of your grader... follows the grader blade, gives a smooth even surface without extra trips. Unit is ruggedly built for trouble-free service.

**YORK RAKE, MODEL RE** fits all 3-point hitch tractors. Scarifier attachment (optional) breaks up hard-packed ground, rips out roots and stones. Lifts out of way when not in use.

**YORK RAKES, MODELS RA and RB** (trailer-types) also available for use with regular motive power.

Let YORK show you how you can save time and labor, do a better grading job.

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**MODERN CORPORATION**  
**UNADILLA, NEW YORK**

tained on rebuilt rails and on the flexibility possible in controlling the hardness of a deposit by a slight change in voltage. Rails are rebuilt at 27-28 volts, while rollers and idlers are capped on the universal multiple-spindle machine at 30-32 volts to give a slightly harder surface.

The twin-head machine for rebuilding rollers and idlers can handle six rollers at a time. The smooth deposit made with alloy flux eliminates grinding of the rebuilt part. The machine's gear rack permits tilting the chuck or table up or down. This allows welding of flanges without removing rollers from the machine.

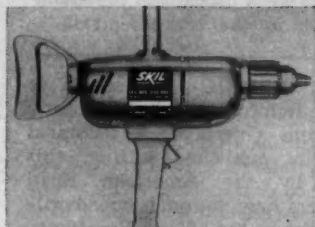
The four 600-amp generators are mounted outside the shop. Only two of them have 35-volt exciters. The other two are installed for dual-head operation and have standard 115-volt exciters. This arrangement saves the additional cost of two 35-volt motor-generator exciters.

Generators are used in preference to rectifiers because small fluctuations in the input primary voltage do not affect the motor-generator sets. This is not the case with rectifiers. A steady output voltage gives better quality control at the arc.

In addition, the company has installed a Lincoln Electric mechanized ML-3 squirt welding unit for attaching grouser bars. Formerly, these were welded on manually with low-hydrogen electrodes. By manual methods, it took an operator 3 min 10 sec of arc time to complete a weld on one side of an 18-in. grouser bar.

With the mechanized equipment moving at 22 in. per min, average arc time for a weld across one side is 49 sec. This represents a saving of about one-third in the man-hours necessary to rebar a set of D6 tracks.

**1 LIGHTWEIGHT!** ½-inch Model 290 Reversing Drill has new compact, streamlined design for better control. Weighs only 9½ pounds.



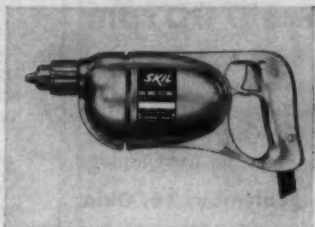
**2 EASY HANDLING!** ½-inch Model 2103 Drill tackles toughest drilling jobs up to ½-inch in steel. Also available as reversing model.



**4 BRUTE STRENGTH!** 1-inch Model 163 heavy-duty drill has recessed Morse Taper Socket that reduces drill length for better control.



**3 COMPACT!** Pistol grip design ½-inch Model 138 drill can't be beat for general utility drilling in steel up to ¾-inch.



**5 VERSATILE!** ½-inch Model 243 heavy-duty drill has extra power for day-long heavy-duty work. Quality built throughout.



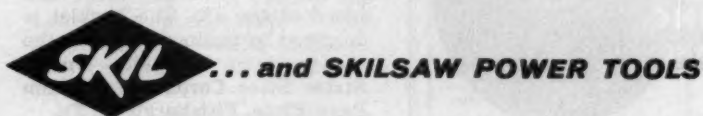
# 5 POWERFUL REASONS WHY you're smart to choose SKIL DRILLS...

and there are 16 more where these came from!

Rugged, powerful SKIL drills are made the way *you'd* build a tool... with something extra in the "built-for-keeps" department... beefed-up bearings, gears and switches for fewer breakdowns and next-to-nothing maintenance costs... with stamina to keep at it week after week, straight through the calendar... and plenty of power to spare when the going gets heavy.

Twenty-one different models in all—from compact, powerful ¼-inchers up to ½-inch and 1-inch "big-jobs"—mean you pick the drills that suit *your* job (and budget) requirements exactly.

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## Jaeger pays off with 600 cfm at 1700 rpm

This Jaeger rotary compressor, powered with the same GM 6-71 diesel used in other makes, produces 600 cfm of air with 100 fewer revolutions (1700 rpm instead of 1800), consuming less than 1 1/4 lbs. of fuel. Think of the long-term saving in fuel, and engine and compressor life. Other Jaeger sizes are comparably efficient. See your Jaeger distributor, or send for Catalog.

The Jaeger Machine Company, 800 Dublin Ave., Columbus 16, Ohio

## LOW COST POWER for WRECKING-SMASHING FREDERICK CAST Semi-Steel DROP BALLS

Tough, rugged Frederick Drop Balls eliminate expensive drilling, blasting . . . deliver smashing low cost power when you want it, where you want it. Exclusive "Pear-shape" design drops straight—swings true—withstands greater impact. Balls 4000 lbs. or over are made of extra durable nickel alloy—or special alloys furnished on request. "E-Z" Swing recessed steel eye gives greater cable protection plus free swinging action. Balls can be furnished with replaceable pins. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Special release hooks for free dropping also available.

Wide range of sizes and weights

Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.).....	500	1000	2000	5200			
Spherical shape (lbs.)..	470	950	1650	2400	3000	3700	5400
(for magnet use)							

Write us today for prices and illustrated literature, order Balls direct or see your nearest Equipment Dealer.

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## New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

**WIRE FABRIC**—Welded Wire Fabric Reinforcement of Asphaltic Concrete Overlays, a technical bulletin published earlier this year by the American Road Builders Association, is now available from the Wire Reinforcement Institute. A major portion of the 16-p booklet discusses job-rigged devices for proper handling of the wire fabric. Layout and positioning of the fabric are explained for different applications.—**Wire Reinforcement Institute, National Press Bldg., Washington 4, D. C.**

**NEW CRANE**—An 8-p bulletin features the new 18-ton Lorain Moto-Crane, Model MC-218. It describes the rubber-tired carrier with turntable mounting, hydraulic power steering and brakes, and welded outrigger boxes.—**The Thew Shovel Co., Lorain, Ohio.**

**STEEL-PLY FORMS**—Symons steel-ply forms, available in sizes from 3 to 8 ft, are described in a 16-p catalog. It illustrates applications of the forms for slabs, culverts, and circular or battered walls. It also lists accessories such as fillers, corners, stoop forms, pilasters, and ties.—**Symons Clamp & Mfg. Co., 4249 West Diversey Ave., Chicago 39, Ill.**

**PUMPS**—Marlow's complete line of self-priming pumps are described in a new 16-p catalog. It illustrates Marlow's diffuser and impeller design for priming action and easy repair.—**Bell & Gossett Co., Midland Park, N. J.**

**STEEL WELDING**—A detailed booklet on how to weld T-1 Steel is available from U.S. Steel. It contains a "heat input calculator," a circular slide rule for determining correct heat amounts in relation to amps, volts, and speed of the arc. The booklet is designed to guide welders in the shop and in the field.—**United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.**

**PLANT EQUIPMENT**—Reliance describes its heavy duty equipment for sand and gravel plants in a new bulletin. Illustrations and specification for washing screens, paddle-type sand classifiers, reciprocating and belt conveyors, bucket elevators, rock crushers, and steel bins are included.—**Universal Road Machinery Co., Kingston, N. Y.**

**MOTOR DRILL**—Technical features of the 53-lb Cobra gasoline-powered motor drill and breaker are covered in an Atlas Copco folder. The self-contained portable unit is designed for rapid conversion from drill to breaker and for operation in tightly confined areas or where it may be difficult to transport a compressor. Obtainable through district sales offices.—**Atlas Copco Eastern, 610 Industrial Ave., Paramus, N. J.; Western, 930 Brittan Ave., San Carlos, Calif.**

**ELECTRIC BLASTING**—Atlas has published an authoritative handbook on electric blasting in compact handbook size. It describes techniques to minimize cut-offs, help control throw, reduce noise, and improve breakage. Also available is a blasting cost chart for recording cost data.—**Atlas Powder Co., Wilmington 99, Del.**

**COMPRESSORS** — Gardner - Denver describes six models of its rotary portable air compressors, ranging from 85 to 900 cfm, in a new bulletin. The 8-p pamphlet gives specifications for the small 85-cfm air-oil-cooled model RP85, as well as five larger water - cooled compressors. — **Gardner Denver Co., Quincy, Ill.**

**BATCH TRUCKS**—Remote control batching equipment is described in a Galion booklet. Included are cab-operated push button control panels, hydraulic stabilizers, levelizers, and side-mounted trippers for instantaneous release of batches.—**Galion Allsteel Body Co., Galion, Ohio.**

**TRACTOR SHOVELS**—Details of Allis-Chalmers 150 hp HD-16G and 225 hp HD-21G torque converter drive tractor shovels are described in an 8-p catalog. Included are specifications of both tractor shovels.—**Allis-Chalmers Mfg. Co., 1126 S. 70 St., Milwaukee 1, Wis.**

*continued on next page*



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*"the Key"*

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✓ Resurface concrete using T-K Patch as the cap

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Twin heavy duty, general purpose Cableways, each designed to handle a normal hook load of 22,000 lb. (9.8 tons) at speeds specified:

Speeds	
Hoisting	300 ft. per min.
Lowering	200 ft. per min.
Carriage Travelling	1,200 ft. per min.
Tower Traversing	50 ft. per min.

Spans  
Higher Cableway 1,735 ft.  
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At 930 ft. from the Head Tower, with a lowering distance of 250 ft., each Cableway should be capable of placing 50 cu. yd. of concrete per hr. with a 4 cu. yd. bucket.

Cableways are complete and include:—Fixed 100' Head Tower, two (2) 40' height, 30" gauge, Traversing Tail Towers, Machine House, Main Cable, Main Cable Take-up Tackle, Main Cable Take-up Winch, Carriage, Fall Block, Main Winches, Tail Tower Traversing Gear, Compressed Air System, Warning Signals, Lifting Appliances, Word Leonard Electrical Controls, etc.

Specifications and further particulars may be obtained from the

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Construction Methods and Equipment published Monthly at New York, New York, for October 1, 1959.

1. The names and addresses of the publisher, editor and managing editor are: Published by McGraw-Hill Publishing Company Inc., 330 West 42nd Street, New York 36, N. Y. Editor, Henry T. Percs, 330 West 42nd Street, New York 36, N. Y.; Managing editor, Ross Hazeltine, 330 West 42nd Street, New York 36, N. Y.

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By JOHN J. COOKE, Secretary

Sworn to and subscribed before me this 10th day of September, 1959.

(SEAL) JANET A. HARTWICK

(My commission expires March 30, 1961)

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## NEW PUBLICATIONS...

continued

**SHOVEL PARTS**—A 4-p brochure illustrates the Kensington line of shovel replacement parts made from alloyed manganese steel. It covers treads, tooth points, sprockets, idlers, rollers, and rack and pinion assemblies for all makes and models of crawlers, shovels, cranes, and draglines.—**Kensington Steel, 505 Kensington Ave., Chicago, Ill.**

**CONCRETE SAWS**—A 4-p Clipper catalog covers concrete saws and blades. It features the firm's entire line of electric and gasoline-powered saws, including the latest 56-hp longitudinal saw. Diamond and reinforced abrasive blades are also covered. Price lists also are included.—**Clipper Mfg. Co., Kansas City 8, Mo.**

**SCAFFOLDING** — Beaver - Advance has published two booklets describing its tubular scaffolding line. Catalog No. 62 covers the panel and brace locking mechanism with specification data and safety rules. Bulletin No. 69 illustrates Advance scaffolding in various applications from ground breaking to building occupancy.—**Beaver-Advance Corp., 12th St. and Factory Ave., Elwood City, Pa.**

**DUMP TRUCK**—The model 100 Dumptor, a 10-yd, off-road hauling unit, is featured in a new Koehring bulletin. It describes the unit's two-way controls for driving in either direction and its ability to increase yardage hauled through its no turn operation.—**Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.**

**TUNNEL CONCRETING**—A 28-p Master Builders booklet describes how concreting problems on 12 tunneling projects were solved with the aid of Pozzololith. The case histories include railroad, water, and highway tunnels.—**The Master Builders Co., Cleveland 3, Ohio.**

**STRUCTURAL STEEL**—Information on new Allspan open-web structural steel framing members is available in a 28-p manual. The booklet gives complete dimensions, properties, and construction details for all sizes of Allspans.—**Macomber Inc., Canton 1, Ohio.**



### **Drill Steel helps move 900,000 cu yd for new mountain highway**

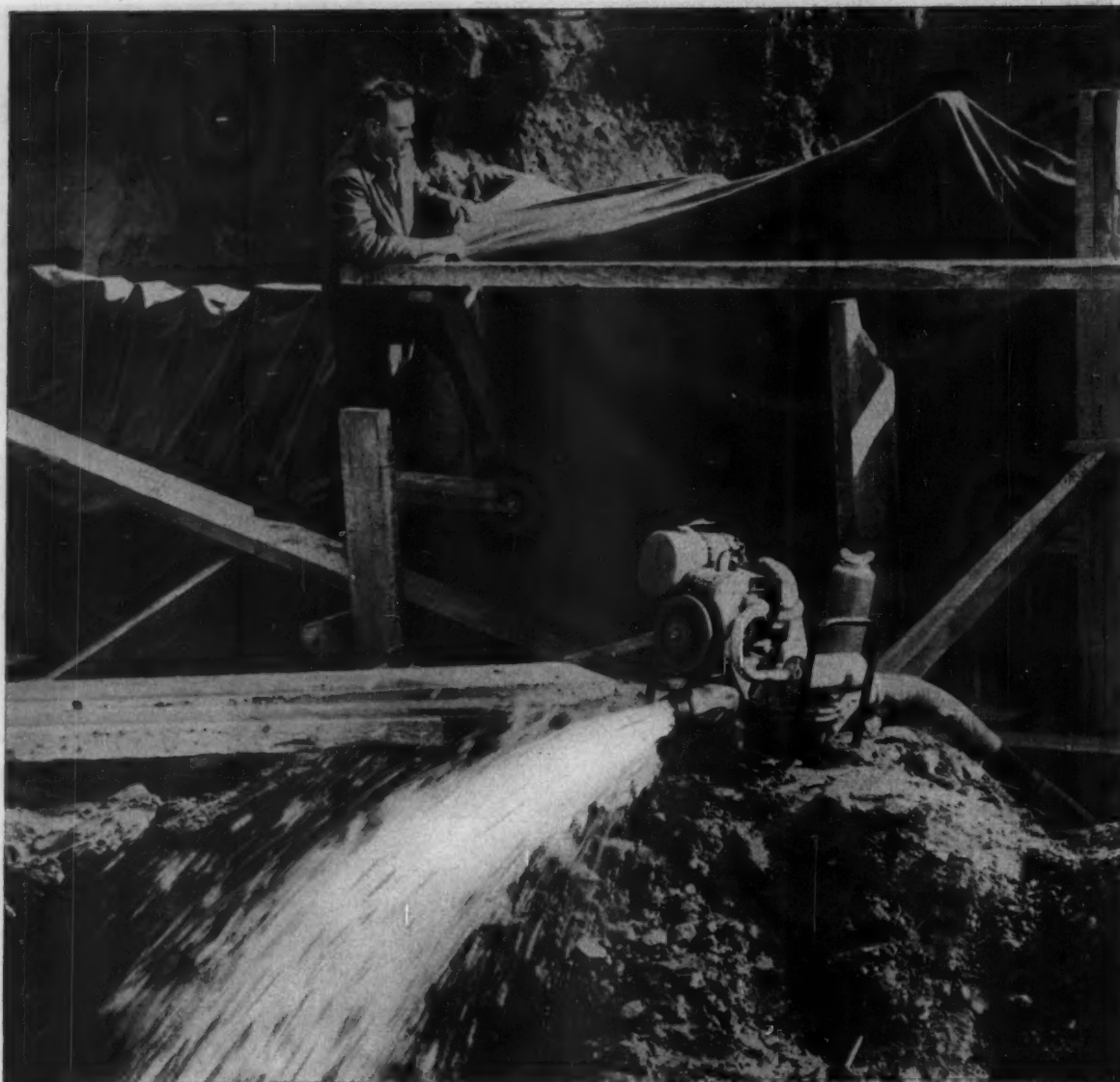
These wagon drills, using Bethlehem Hollow Drill Steel, were photographed recently as they bored blast holes in hard sandstone atop Broad Mountain, in eastern Pennsylvania. The 2½-mile project, on winding Route 29 near Nesquehoning, was handled for the Pennsylvania Dept. of Highways by J. H. Beers; Howells Mining Drill Corp. serviced the drill steel. The Bethlehem Hollow, which comes in Carbon and Ultra-Alloy grades, turned in a low-cost job . . . just as it is doing in hundreds of rock removal projects across the nation.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

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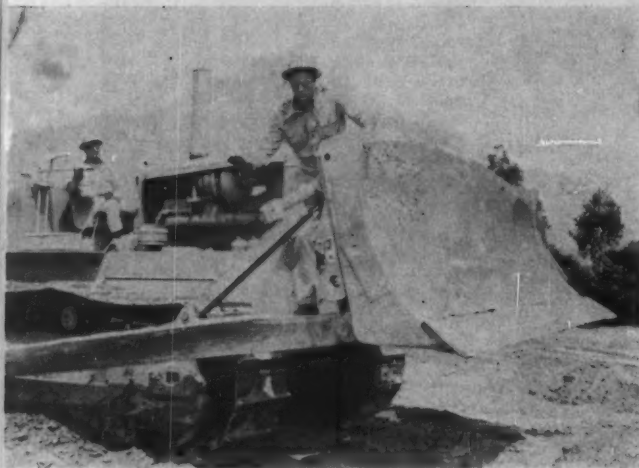
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# Methods Memo...



## TV Heroes Ride Dozers

Tough construction men now are competing with gunslinging cowboys and suave detectives for high television ratings. "Troubleshooters," a new weekly TV show, recounts the adventures of a heavy construction crew on jobs all over the world.

Star of the show is Keenan Wynn (left) who plays Kodiak, the hard-bitten, self-taught foreman. Wynn, son of comedian Ed Wynn, is an experienced Broadway and motion picture actor.

Co-star is Bob Mathias (right) who plays Dugan, a college-trained assistant to Kodiak. Mathias is a former two-time Olympic decathlon champion and Stanford University fullback.

The supporting cast includes four rugged types who are part of the construction crew. All six of these principals attended a Caterpillar school to learn how to operate dozers and other heavy equipment. And they do actually operate the machines before the cameras.

Some of the situations are as phony as a left-handed monkey wrench. For example, in the first show a truck loaded with hot nitroglycerin teetered for an agonizingly long time on the brink of precipice. Why they were carting around all that nitro is a mystery.

The idea of a dramatic series with a construction theme belongs to Keenan Wynn. He considered casting himself as an infantry sergeant or a Seabee chief petty officer but decided playing a construction foreman offered a better opportunity for unusual dramatic situations.

The show is on the NBC network on Friday nights.

## Building with Beer Bottles

An East German brewery is selling its beer in square bottles that can be used, when emptied, as a building material.

The neck of one bottle fits into a recess in the bottom of another. Anyone who collects enough bottles can build a wall or pave a patio.

## Everybody's Happy

That auction of surplus construction equipment by closed circuit TV last month paid off for the federal government. And some contractors picked up real bargains, too.

The government realized a gross return of \$235,471 on construction equipment it paid \$839,000 for. That's a recovery of 28%. Usually a 15% recovery is considered pretty good.

And here are some of the bargains contractors picked up:

- Chadwick Construction Co. of Meriden, Conn., paid \$9,100 for an unused Iowa model 2A crusher with a capacity of 35 tons per hr that cost \$22,255.
- William Schloss Paving Co. of Cleveland, O., paid \$7,550 for another unused Iowa crushing and screening plant that cost the government \$24,460.
- States Improvement Co. of Maywood, Ill., got an unused Lima model 34 crawler crane for \$8,000. It cost the government \$21,648.

Bidders sat comfortably in auditoriums at New York, Chicago, Philadelphia, Boston, Columbus, and St. Louis looking at equipment in Army Engineer depots on TV screens. Bidding was by two-way radio.



## Experimental Power Unit

That's not an electronic computer where the engine of this tractor should be. It's a new type of power unit.

Allis-Chalmers is testing an experimental tractor powered by fuel cells, devices that convert chemical energy to electrical energy. There are 1,008 fuel cells in this power unit; they develop about 3,000 lbs drawbar pull.

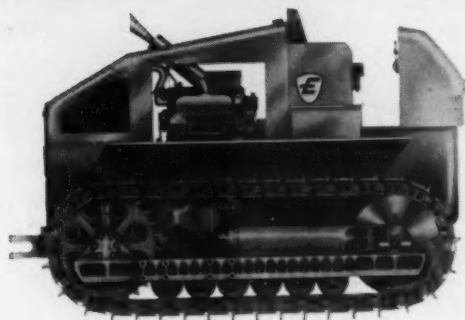
A mixture of gases—largely propane—is fed into the cells and reacts to produce an electric current. The controller at the left of the operator regulates the speed and reverses direction.

Fuel-cell power units have a potential efficiency of 90%. That compares with about 40% efficiency for the best diesel engines.

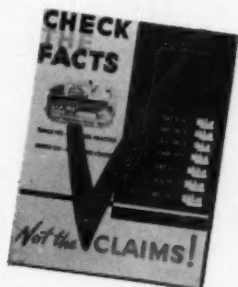
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"WHAT DO YOU WANT  
IN A BETTER TRACTOR?"

THEN WE ENGINEERED AND BUILT IT . . .



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For all the facts on additional features, write for specifications and comparative Fact Brochure, listing vital statistics of all leading makes of tractors and front end loaders.

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Eimco engineered "Quadra-Torque", giving you a choice of four forward and four reverse speeds. You can shift from one to the other or from forward to reverse and back again at any tractor or engine speed by the flip of a lever, without slowing or stopping tractor. Gears never reverse rotation in Eimco's exclusive "Unidrive" transmission. Soundly engineered simplicity means less maintenance, longer life.

You wanted rugged construction, with minimum maintenance problems

Unitized "Stress Flow" Construction is the answer, another Eimco exclusive. No bolts; no welds. Large, strong steel castings are molded to shape and thickness required for new, greater strength and rigidity. Main frame, final drive and center housing on Eimco 103 are all in one strong casting, as is track roller frame and diagonal brake assembly, yet components are still readily accessible!

You wanted reliable, proven power plants.

The Eimco 103 is powered by 100 HP General Motors or Cummins Diesels of latest, modern design and efficiency, teamed with single stage heavy-duty torque converter, for full utilization of power.

You wanted sufficient ground-clearance.

The Eimco 103 has full 17" ground-clearance, over 40% more than the average.

B-459

## CARBIDE INSERT? or ALL STEEL?

**LOCATION:** U.S. highway at Virginia Dale, Colorado

**OPERATING CONDITIONS:** Medium hard to very hard granite

## "We switch our **TIMKEN®** bits and drill up to 10 inches per minute in granite"

*... Reports Northwestern Engineering Co.*

**G**RANITE in varying hardness—that was the problem facing Northwestern Engineering Co., of Denver, in drilling the blast holes for relocation of the U.S. highway at Virginia Dale, Colorado. They solved the problem by using Timken® all steel multi-use bits in the *medium-hard* granite—then switching to Timken carbide insert bits for the *very hard* granite. And they averaged 6 to 10 inches per minute!

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